THE RUBBER AGE

ESTABLISHED 1917

COVERS ALL PHASES OF THE PRODUCTION AND MARKETING OF CRUDE RUBBER AND THE MANUFACTURE AND DISTRIBUTION OF RUBBER GOODS

Vol. 37 SEPTEMBER, 1935 No. 6

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THE RUBBER AGE, published on the 15th of each month by the Palmerton Publishing Company, Inc., at East Stroudsburg, Pa. Editorial and Advertising offices at 250 West 57th Street, New York City. Established 1917.

Entered as Second Class Matter, October 20, 1933, at the Post Office at East Stroudsburg, Pa., under Act of March 3, 1879.

Subscription Rates: Domestic, $2.00 a year; Canada, $3.00; Foreign, $3.00. Single copies, up to 3 months old, 25 cents; over 3 months old, 50 cents.

Telephone: COlumbus 5-2923, 5-2924.

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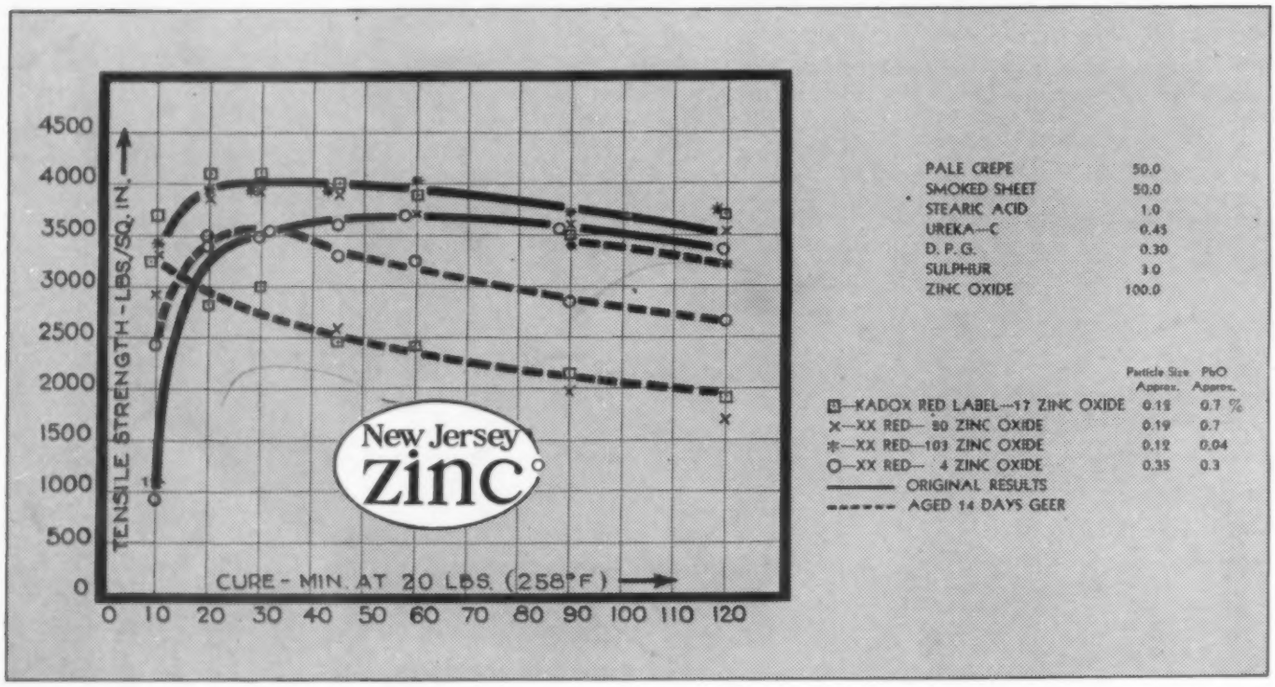

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THE RUBBER AGE

Published Monthly at East Stroudsburg, Pa.
Editorial and Advertising Offices: 250 W. 57th St., New York

Vol. 37 SEPTEMBER, 1935 No. 6

Rubber Solvent From Petroleum

By Bruce C. Dodd

Bruce C. Dodd & Company, Industrial Naphtha Consultants

SHORTLY after the turn of the 20th Century, three giant industries began to develop and expand. These industries were closely allied—the success of one meant the success of another—the development of one meant increased business for the other two, and when all three started an extensive research and development program, results were attained which have affected the lives and opportunities of people throughout the entire world. Those three industries were the automotive, petroleum and rubber industries.

Industrially speaking, the rubber industry long has been one of the best customers of the petroleum industry. It is common knowledge that large quantities of oils and greases are used to lubricate the intricate machinery required to produce the many rubber articles manufactured today. The industry at large, however, does not realize the high percentage of petroleum products that actually find their way into the rubber compound.

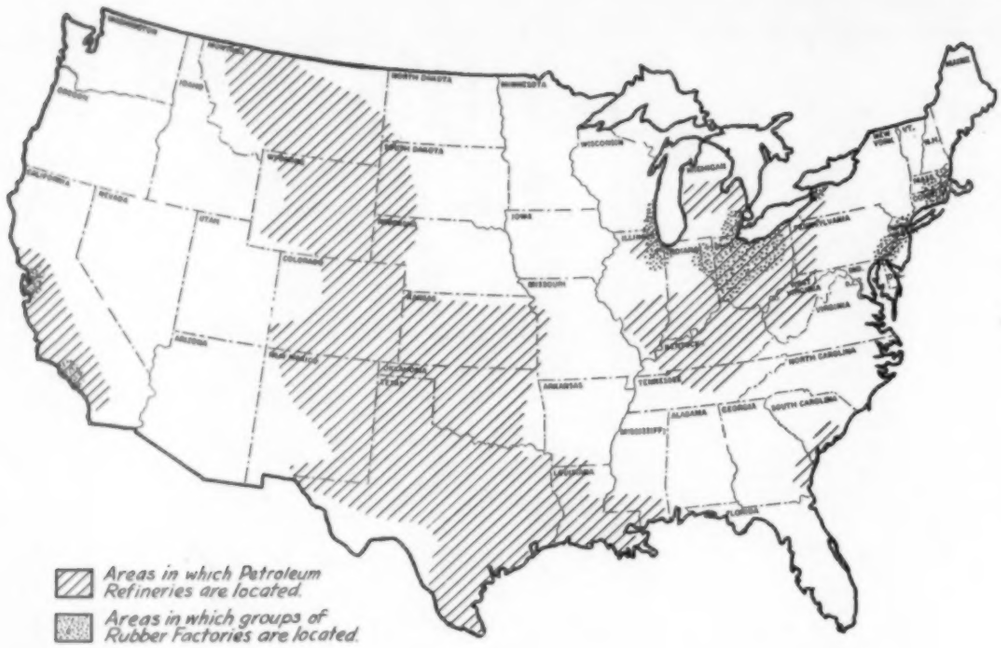
Carbon black, extensively used by the rubber industry, is a product of the burning of natural gas. Mineral rubber, also heavily consumed, is a specially prepared petroleum asphalt. Various grades of oils and Petrolatum are used to produce workability of the compound and, lastly, in the manufacture of cement and in the building operations of tires and tubes, rubber solvent gasoline and naphtha are consumed in material quantities.

It can be seen from the above that the rubber industry consumes from petroleum, products made, first, from the gas; second, from the gasoline stream; third, from the lubricating fractions; fourth, from the waxes and greases; and, fifth, from the asphalt. This means that a very high proportion of the products produced from a barrel of crude oil find their way into the rubber factory. A few years ago I examined a standard tread compound and found it contained better than 62% petroleum hydrocarbon.

In the production of carbon black for the rubber industry, the location of the carbon black plant and the price of this product to the rubber manufacturer, were controlled to a great extent by the activity and knowledge of the oil scouts. As the petroleum industry became more proficient in determining the location of new pools and as these new pools were developed, large quantities of natural gas were brought in in these locations. This resulted in the erection of carbon black plants at these new pools with an ever increasing number of manufacturers and a continual revision in the point of origination of the product.

The same general situation with regard to rubber solvent gasoline and dipped goods naphtha has existed. When rubber solvent gasoline began to replace benzol in the manufacture of cement, rubber solvent was supplied only from refineries in Ohio, Pennsylvania and West Virginia. It was natural that these refineries should originate that new use for a petroleum product. They were close from a transportation standpoint, and the crude oil upon which they were operating was highly desirable for the manufacture of rubber solvent. Pennsylvania crudes long have been noted for their low sulphur content and for their freedom from unsaturated hydro-carbon, likely to react with products in the rubber compound.

Rubber solvent gasoline and dipped goods naphtha are required primarily as carrying agents, or to temporarily change the physical characteristics of the rubber, or the rubber compound, for ease of handling, ease of application, or for some other mechanical purpose in the manufacturing operations. The change desired being only for a temporary period, it is essential that at the end of that period, when the rubber solvent or dipped goods naphtha has been removed, that the compound be unaffected. The paraffin hydro-carbon, because of its stability, is a desirable product for this job.



The rubber solvent gasoline which was being supplied from Ohio and Pennsylvania crudes, also was being consumed as high test gasoline by the automotive industry, and since the automotive industry was a greater volume consumer than the rubber industry, the requirements of an internal combustion motor exerted more effect upon the specifications of the material than did the requirements of the rubber industry. Further, the Pennsylvania refineries were concentrating their development departments upon lubricants. As a result, the fractionating equipment for their light products did not keep pace with the development of fractionating equipment for the petroleum industry. This general situation made the loss of the rubber solvent business merely a matter of time and opportunity.

At about the same time that the inferior quality of rubber solvent began to inconvenience the rubber manufacturers, an excessive production of crude oil in the Mid-Continent field began to make itself felt by the entire petroleum industry. The Mid-Continent refiners, realizing that the volume of crude oil they had available for processing would require movement beyond their normal marketing limits, developed their fractionating equipment. Because of their attention and modernization of equipment for the production of light fractions from their crude oil, it was only a short period of time until rubber solvent, manufactured from Oklahoma and Texas crude oils, began replacing rubber solvent manufactured in Ohio, Pennsylvania and West Virginia. Within a period of a few years, the great majority of this business was being secured by the Mid-Continent refiner.

Approximately five years ago, the people of Michigan began to realize that there was a large quantity of crude oil available in that State. Refineries were erected and several important crude producing fields were developed. The crude oil found in the Michigan area was not particularly adapted to the manufacture of motor fuel as it was high in sulphur content and low in anti-knock value. Improvement in refining technology made it both possible and practical for the Michigan refiners to turn their attention to the manufacture of solvents for the rubber industry. The last few years have seen a very considerable increase in the quantity of rubber solvent which has originated in Michigan crude oil. Because of transportation economies, Michigan has replaced, in the Ohio area, approximately 50% of the total rubber solvent volume to the tire and dipped goods industries.

Since the development of rubber solvent from petroleum, the rubber industry has seen their source of supply originate in their own back yard, figuratively speaking, and then, as did the pioneers of old, it left the old neighborhood and traveled South and West, nearly across the United States, to new fields. But just as the traveler eventually returns to his old home, apparently rubber solvents have started their trek back across the United States towards the place of their origin. Improvements in the processing of petroleum, as well as definite economic and political forces, are slowly, but surely, returning the rubber solvent business to the refiners of Pennsylvania crude oil.

There has been a modernization program going on in the Pennsylvania field for some time. Several of the refiners in that area have installed cracking plants for the manufacture of higher anti-knock value gasoline, as well as modern fractionating equipment satisfactory to the production of high quality industrial naphthas, rubber solvent, etc.

During the last few years a concerted research and development program for the further refining and improvement of lubricating oils by solvent extraction, has been in progress. This method of refining is improving the quality of lubricating oils made from crude not normally possessing the lubricating advantage of Pennsylvania crude oils. Large can manufacturers have recently convinced the petroleum industry that the sale of lubricating oils in tin cans was a merchandising advantage since it increased the potential distributors of their lubricants.

The new refining process and the new merchandising process for lubricating oils, both reaching the market at approximately the same time, have increased materially competition to Pennsylvania motor oils. This situation apparently is causing some of the Pennsylvania refiners to focus their attention on the manufacture of products which, for numerous reasons, have not been in their line. Naphthas and rubber solvent, consequently, have been given increasing attention during the last three to four years.

During the last several years practically everyone has been made conscious of the numerous and disastrous price wars which have continuously affected the petroleum industry. Many reasons have been advanced for these wars and, undoubtedly, there are many contributing factors but, apparently, the key to the trouble has been in the discovery of the many great crude producing areas, together with the unwise production of crude from these pools in quantities radically in excess of the market's ability to consume.

Both the petroleum industry and the governing bodies of the oil producing states and the Federal Government, realizing this situation, have taken steps to control the quantity of crude oil which can be produced in the various states for movement into their normal marketing channels. You can see from the above facts that the last piece has been dropped into the jig saw puzzle, showing the traveler definitely on his way home to the refiners of Ohio-Pennsylvania crudes. In conclusion I will summarize the forces causing this trend in source of supply:

First, control of excess production in crude oil has eliminated much of the excess crude in the various refining fields, causing the refiners to analyze their logical markets and merchandise to those markets more carefully.

Second, ridiculously cheap prices for crude in territories under flush production have been largely eliminated and, at the same time, eliminating the advantage to that refiner of shipping beyond his normal marketing area.

Third, modernization of fractionating equipment in the Pennsylvania field has made practical the refining of suitable specification products.

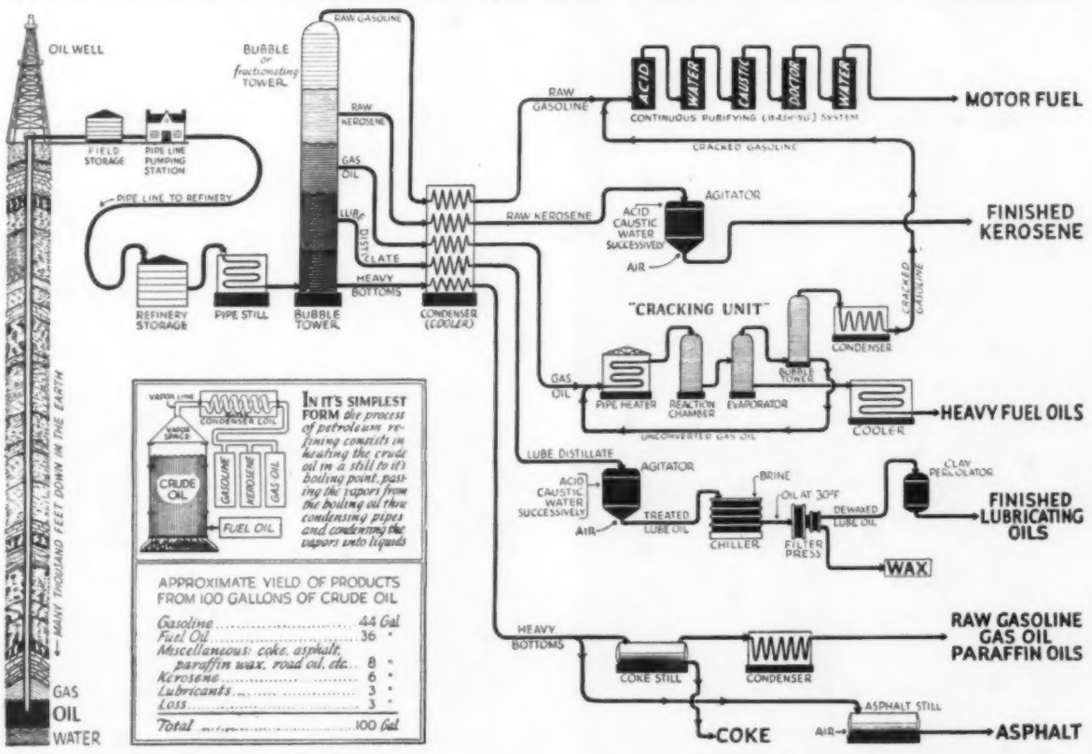
Fourth, increased competition to the Pennsylvania refiner for the high grade lubricating oil business, due to lubricating oil refinery improvements and canned oil merchandising, has caused the Pennsylvania refiner to seriously consider the increasing of his line of quality petroleum products, with particular reference to the lighter fractions of his crude oil.

Fifth, the type of crude oil is advantageous to the production of rubber solvent, naphtha and gasoline, possessing natural advantages to the refiner and the rubber manufacturer not normally possessed in other crudes.

Sixth, the location of the Ohio-Pennsylvania fields and the operating refineries, show a material transportation savings. With the cost of rubber solvent and naphthas to the rubber manufacturer, showing on examination that approximately 25% of the gross cost is that of transportation on material originating in Michigan and approximately 40% is transportation cost on material originating in Oklahoma, while approximately 12% would be the transportation cost percentage for the Pennsylvania refined products, the economic strength of the last point makes itself very apparent. (Figures are based upon existing markets on rubber solvent, naphthas and gasoline for movement into the Ohio territory. Different ratios would be in effect for movement to the Eastern States.)

Since the introduction of the high compression motor by the automotive industry, Pennsylvania gasolines, with their low anti-knock value, unless subjected to the cracking process of refining, have been a constant disturbing element in the reduction of motor fuel markets in the Central States, as such motor fuel could only be moved at a price. The return of Pennsylvania refineries, therefore, as a source of supply for rubber solvent, appears to offer the possibility of becoming an economic phenomenon in that everyone involved should be financially improved by this transition: First, the rubber industry by having their most logical, economic source of rubber solvent again available and, second, the petroleum industry through the conversion of a price-disturbing product to an economically desirable quality member of the petroleum family, offering advantages to both buyer and seller.

Typical FLOW CHART *tracing* crude oil *from well to finished product.*



Drawn by A. M. Singleton, New York, 1934

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Goodyear's Java Tire Factory

Newest Unit in Goodyear's Foreign Manufacturing Set-Up Is Equipped to Produce 300 Tires and 300 Tubes Daily

ALTHOUGH the tire manufacturing factory erected by the Goodyear Tire & Rubber Company in Buitenzorg, Java, Netherlands East Indies, was not declared officially open until the visit of President Paul W. Litchfield in early June of this year, tire production has been under way since April 29 when the first tire, a 6.00-16 Goodyear Airwheel, was cured. The Buitenzorg unit is believed to be the first of several tire factories planned by Goodyear in the Far East, with Singapore tentatively selected as the next site.

Ground for the Java factory was broken on November 8, 1934. The site of the building is on an old 28-acre rubber plantation. In addition to the factory units six permanent homes of modern design are being built for the resident engineering and operating personnel. The Java factory was built under the supervision of W. D. LaDue, Goodyear construction engineer, who has been in charge of the erection of the majority of the company's foreign plants as well as its American cotton mills.

In keeping with the best engineering practices for tropical countries the Java unit is an open air factory, measuring 460 feet in length and 200 feet in width. It is constructed of steel throughout, including trusses and corrugated composition roofing. Only the drying and raw material storage rooms are entirely enclosed and equipped with windows. The engine and boiler rooms are housed in a building separate from the main factory.

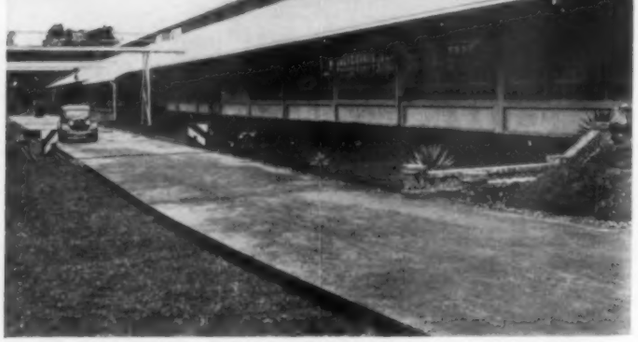
With an original daily capacity of 300 tires and 300 tubes, the new plant employs some 200 workers, including the executive personnel. H. I. Belknap is in charge of all production activities in the capacity of general superintendent, while R. W. Hadley acts as managing director of the complete plant. Hadley has been with Goodyear in foreign sales work for the past twelve years, the last four of which have been spent in the Far East operating out of Shanghai, China. He was in charge of Goodyear sales in the Far Eastern territory. Belknap, too, has been in the company's employ for many years. The remainder of the executive personnel is made up of members of the Goodyear Flying Squadron sent from various offices.

Left: R. W. Hadley, managing director of Goodyear's tire factory in Java. Right: H. I. Belknap, general superintendent in charge of production.

With production well under way the Java factory is expected to consume a goodly portion of the rubber output of Goodyear's 93,000 acre plantations in Sumatra. It is believed that the plant was originally planned in order to offset Japanese competition in the Far East. The proximity of the company's rubber plantations places Goodyear in an excellent position to meet this purpose.

The new Javanese factory is the fifth Goodyear unit in a foreign country. Other production units are located in Canada, England, Australia and Argentina. Original tire factories are located in Akron, Los Angeles and Gadsden, Alabama. Goodyear also owns and operates cotton fabric mills in New Bedford (Mass.), Los Angeles, Decatur (Alabama), three in Georgia at Rockmart, Cedartown and Cartersville, and one in St. Hyacinthe, Quebec, Canada. The company operates its own 37,000 acre cotton plantation in Litchfield, Arizona.

An interior view of Goodyear's Javanese factory constructed of steel throughout, which measures 460 feet in length and 200 feet in width.



An exterior view of the new factory in Java which is an open air unit in keeping with the engineering practices for tropical countries.

Growth of Tire Retreading Industry In the United States

Three examples of well retreaded tires.

By Everett G. Holt

Because the tire rebuilding and retreading branch of the rubber industry-at-large has reached sufficient proportions within the past two years to a point where it affects the merchandising and production of tires, and therefore rubber consumption, we are reproducing herewith an excellent treatise of the field prepared by Everett G. Holt, assistant chief of the Leather and Rubber Division of the Department of Commerce, issued as a supplement to the regular Rubber News Letter distributed by the Bureau of Foreign and Domestic Commerce.—Editors Note.

WHEN the International Rubber Regulation Agreement became effective June 1, 1934, it was predicted by some observers familiar with the rapidly changing conditions and adjustments characteristic of rubber history that unforeseeable developments would occur that would have a marked influence on the course of events in rubber. One of the developments that already has a noticeable influence is the recent rapid growth in tire retreading.

Within the past two years tire rebuilding and retreading has grown to the extent that it is now, for the first time, generally recognized as having a definite important place in the tire industry, affecting in turn the merchandising and production of tires, and hence the consumption of rubber. Tire retreading has some chance of becoming an influence in the present rubber control scheme, in a sense comparable to but not so pronounced, as reclaimed rubber was in the days of the Stevenson Scheme.

Tire retreading is fundamentally simply a form of tire repairing. In the early days of the industry, repairing was confined mainly to inner tubes, and every motorist carried a tube repair kit; nowadays such kits are the exception rather than the rule, the average motorist using his spare tire in case of infrequent tube punctures and using the repair facilities of the next service station he comes to. Ten years ago, repairs to casings were confined chiefly to sectional repairs, and third circle mold equipment was the only form in use in repair shops; the effort then was usually to repair the tire so that it would render the amount of service for which it was originally designed.

Manufacturers have for many years repaired defective tires at the factory; six or eight years ago they first began to write mileage contracts with bus line accounts, and this was soon followed by the servicing and repairing of tires under these mileage contracts, it being to the advantage of manufacturers to assure themselves that the tires rendered utmost economical service; it was soon found that such tires could often be retreaded with economy at the factory. Today, full circle molds particularly designed for retreading have become the general rule, and the mechanical equipment has in all respects been greatly improved. It now requires a more considerable capital investment than formerly to establish a properly equipped retreading plant, the allowance for a moderate plant being from $5,000 to $15,000 and up depending on the range of sizes serviced; mold equipment represents only about 40% of the capital required.

Meantime the advent of the balloon tire introduced a new factor. Blowouts, so common with high pressure casings, became much less frequent as the balloon casings were improved, and the carcass of first line casings now can greatly outlast even the improved tread. When the entire non-skid service of the tread is worn away, the carcass may (under proper inflation and care in driving to avoid heavy shocks) still be very little affected, especially if the tires have been in fairly constant use as in taxicab or other fleet service, or on cars driven by travelling salesmen. Even in ordinary passenger car service, casings with treads worn smooth within three years from entry into service are frequently worth retreading.

California may properly be considered the birth-place of the modern retreading industry; the birthday was coincident with the beginning of the depression—and this rapidly growing business is another of the so-called "depression babies" which is approaching maturity under improving economic conditions. In California, starting about 1929, retreading of tires began to gain headway rapidly. Small rubber manufacturing companies on the West Coast supplied the retread stock, known in the trade as "camel-back", and they developed a fully satisfactory material which the vulcanizers learned to apply with excellent practical results. The camel-back is compounded rubber, extruded from a tubing machine in form and size suitable for application to the carcass as a new tread. It is sold in lengths, the price to vulcanizers and retreaders being on a per pound basis. During the early years of the depression, on the declining rubber market, the small rubber manufacturers were able to sell the material at constantly cheaper prices, making the cost of retreading very low to tire users.

The number of tires retreaded in California in 1929 may have been about 250,000; in 1933 it is estimated that fully 1,000,000 casings were retreaded in that state. It is claimed that weather and road conditions in California, with its relatively dry climate, are particularly suitable

for long life of tire carcasses. The word "rebuilt" was used to curry public favor, and in California the term has lost much of the stigma formerly attached to "retread" in the earlier days.

Retreading in Los Angeles is a factory business, there being 5 companies there retreading each an average of 500 daily according to reports, and 40 or more additional firms doing 10 a day or better. In San Francisco and Oakland, the business is on a smaller scale, and custom retreading is more the practice than in Los Angeles.

From California, retreading gradually spread to the North-West and the Mid-West. Early in 1934, there were only 5 retreaders in Washington, Oregon, Idaho and Montana combined, and only 2 in Colorado, Utah, Nevada, and Wyoming combined.

Retreaders in the East

The East also has its retreaders in urban centers, several of them with years of experience. Philadelphia, New York, Baltimore, and Providence had establishments averaging from small amounts up to 200 a day in early 1934; Chicago had two plants at least; from all sections of the country, in 1934, reports were constantly being received of expansion of existing production facilities for retreads and the entry of new firms into this line of business. On the West Coast, truck tire retreading has been a sideline; in the East, truck and bus tire retreading has often been the more profitable side of the business, until recently at least.

Early in 1934, the major tire companies took cognizance of the situation and in view of the demand for camel-back, began to sell it in competition with the smaller California producers. On the rising rubber market the large manufacturers, producing from stocks of rubber inventoried at lower than current market prices, held a price advantage over the smaller companies operating on shorter supplies, besides which the reputation of the "majors" was an added sales asset. Some idea of the growth of camel-back sales in 1933-34 is afforded by a comparison based on the quarterly reports of the Rubber Manufacturers Association on consumption of rubber and sales value of products included under tire sundries and repair materials, the tonnage figures being most indicative. (According to these reports 3,600 tons were consumed by tire sundries and repair materials in 1931, 3,288 tons in 1932, 4,464 tons in 1933, and 7,876 tons in 1934. The value of shipments of these materials does not correspond to the increase in consumption of rubber because of a rapidly deflecting price trend.—EDITOR).

During the first quarter of 1935, rubber consumption under this classification was reported at 2,218 long tons and the value of shipments was $3,188,000. The increased rubber consumption reported for 1933 may have been due to recovery only, but the increase in 1934 and 1935 is directly traceable to the retreading and repairing of casings. This increase has not been entirely the result of camel-back sales, however, because in order to provide carcasses for retreading, preliminary repair work on carcasses has been resorted to by some retreaders. About half of the rubber under this classification was used in 1934 for camel-back; of the value of 1934 shipments about one-sixth represented camel-back sales.

In late 1934 and early 1935, the major tire companies themselves entered the retreading business. Sales of low-price tire lines were being noticeably reduced by competition from retreads which were being merchandised by more and more dealers constantly. The dealer profit per tire was higher on a retread than on a new low-price tire. One company announced the opening of 6 plants at various locations and indicated their plan to open 25 establishments in the near future. Others have followed rapidly, and today nearly all are conducting retreading operations in connection with their company-owned stores and service stations. This signalizes industry recognition that retreading is a practical business proposition no longer in the experimental state, and a distinct competitive factor. During the past two years, suppliers of retreading machinery have been very busy supplying the needs of customers for increased production facilities.

The public is not at present well informed on the subject of tire retreading, but is gradually becoming so, and alert retreaders have thus far built a growing public confidence in their products. The growth of business in the past two years has been very great; the extent of the possible national demand, if retreaded tires were as popular everywhere as in California, can be readily visualized as probably greater than the supply of worn carcasses normally suitable in condition, size and type for retreading purposes; especially might this be true if tire prices should increase. The passenger car size demand in the past has been mostly from drivers of low-priced cars over four years old, and in this field the supply of suitable carcasses is said to be rather scanty.

The extent to which retreading may become a general practice depends on several factors. First of all, mileage per dollar must continue lower than for new tires. This means that selling prices must continue reasonably low and that performance must remain fairly high. Retreaders need to use suitable carcasses and high grade camel-back, avoid misrepresentation, stand back of their product, and pursue business tactics that will build public confidence. For this industry to realize its ultimate possibilities, it would be necessary, secondly, that tire users be educated to take care of their tires by using them so as not to injure carcasses, and to have tires retreaded after they have worn smooth but before the fabric shows through the rubber. This would solve the problem of supply of suitable casings, provided, thirdly, that manufacturers of new tires continue to put out a product with a carcass good enough to last as long as two treads will last.

The durability of retreaded tires depends on the ethics of retreaders very largely. Reputable concerns will not retread a tire not capable of rendering proper service. The probity of the retreader is a far greater factor than the trade name of the tire retreaded. One Des Moines retreader boasts an average of only one failure per 250 retreads, on a production of 18,000 during a 3-year term.

National Association Needed

The success of the industry will depend largely on its ability to win favor by honest practice. Associations of retreaders have made some headway in correcting evils, but there is at present no strong national association. It has been economical for the individual motorist to use as a spare tire a worn casing—a retread would often look better and be safer for emergency use. Dealers in used cars can sell such merchandise more rapidly by replacing smooth tires with retreads, which need to be serviceable for as long as possible beyond the date for final payment on the car by the buyer. Vehicles always driven at medium and low speeds when in service, as when used only in city and town driving, can use retreaded old carcasses to particularly good advantage.

The government is using retreaded tires experimentally on Brooklyn Post Office trucks, and the State of North Carolina contracted this year to have all worn State tires retreaded, when in suitable condition. The fact that busses operated at high speed over long distances can use properly retreaded tires as well as new tires has been amply demonstrated in the servicing of bus mileage contracts by the tire manufacturers. Note, however, that tires on con-

stantly used vehicles get smooth treads much sooner than tires on cars only used occasionally, and that carcass deterioration is more likely to take place before treads are worn smooth in the latter case than in the former; one fleet operator who uses custom retreading facilities customarily discards worn casings over three years old, regardless of condition. On the other hand, much older casings have in numerous individual instances given excellent service after being retreaded.

The possibility of over-extension of production facilities always exists in any rapidly growing industry. The amount of capital necessary for opening a properly equipped retreading establishment is to some degree a balancing factor in this industry. Moreover, the entry of the major tire companies into the retreading field makes for more orderly development, and at the same time the association of well-known tire trade names with retreading has done much to break down public distrust of retreads. According to trade paper sources, the "majors" charge higher prices for retreads than the independent retreaders; their problem is to make a profit from sales of camel-back and retreading services comparable to what would be realized from production and sale of an equivalent number of new low-priced tires, and while over a period of time their reputation might enable them to outsell independent retreaders at an equal price, underselling tactics would cause the independent retreaders to buy camel-back supplies from other sources.

The entry of tire companies into the operation of company-owned stores with the development of auto supply chains and other master service stations has however caused a decline in the percentage of so-called independent tire dealers which maintain tire vulcanizing facilities. In 1931, 14 per cent of the dealers reporting in our survey of dealers' stocks of tires had vulcanizing equipment for passenger car casings and 7 per cent for truck casings; in early 1935, these percentages were only 11.3 and 5.5 respectively. It is not unlikely that the trend may be similar in the retreading business. There is however no fear that efficient independent custom retreaders will be forced out of business, and no indication of any such intention; these firms are usually not subject to overhead costs applicable to the majors, and they are more mobile and adaptable than the tire manufacturing companies can ever become.

The effect of retreading, as of any other form of tire repair, is to increase the distance and length of time that the average tire remains in use. In a recent circular we showed that in the last four years, calculated average tire life in time has been about 2½ years; this year, from present indications, it will be about three years. That retreading is responsible for most of this lengthening of tire life is not yet certain, but it is at least the chief single factor. Motor cars in domestic use in 1933 numbered 24,057,027 and the number of new tires sold for replacement purposes including spare tires sold as original equipment, is estimated at 35,592,000. The number of motor vehicles in 1934, according to statistics of the Bureau of Public Roads, increased to 24,933,403, but similarly calculated 1935 replacement sales of new tires seem at this writing unlikely to exceed 32,000,000, despite the considerable increase in spares for the enlarged 1935 automobile production.

What has been said above indicates that retreaded tires are finding their best markets among price buyers, including not only the second-hand car field (both dealers and owners), but also the fleet operators whose large-scale consumption of tires causes them to study operation costs narrowly. In the passenger car tire field, the demand comes from motorists who would normally not purchase new first-line tires. The retread is in this field competitive mainly with third-line or low-price new tires.

Viscolax—A Rubberized Yarn

A NEW process of combining viscose and rubber in solution and extruding this combination through a spinneret in a manner similar to the spinning of rayon has been developed by Robert Pickles, Ltd., Cairo Mills, Burnley, England, according to *Silk & Rayon*. The amount of viscose is given as about 10% calculated on a dry rubber content of 40%. The name Viscolax has been given the new material.

Because of the introduction of viscose it is claimed there is less tendency for the yarn to form wrinkles than when composed wholly of rubber. Stretching power is slightly reduced but not sufficiently to impair the value of the rubberized yarn as an elastic thread. Tests conducted on Viscolax indicate good uniformity with a stretch of six to seven times the length of the yarn. The following table shows the length in inches that various yarns stretched to before reaching a breaking point on pieces six inches in length:

	STRETCH*			STRETCH*	
	Inches	%		Inches	%
100 denier	48	800	500 denier	58	966
200 denier	53	850	600 denier	54	900
300 denier	37	616	700 denier	45½	758
400 denier	46	766	750 denier	45½	758

* Average stretch for the eight counts was 802%.

After coagulation the thread is vulcanized. It is round when spun and capable of being woven in its uncovered state, or it can be covered with one or two threads of cotton, rayon or silk if desired. Up to the present the 100 denier yarn has been most used, but the process is said to give all deniers from 25 up to 750. Viscolax is already being used in manufacture of bathing suits, socks, shorts, sweaters, corsets, surgical stockings and bandages, and other articles of wearing apparel.

Courtesy, Rebuilt Tire Journal

A section of the retread factory operated by Safety Tire & Rubber Company in Long Island City which is representative of the types of plants devoted exclusively to retreading.

Current Technical Developments

Durez Resin 175

RECENT research of rubber chemicals has led to the incorporation of phenolic resins to produce improved hard rubber surfaces and compounds of greater strength and slower deterioration. The chemical staff of General Plastics, Inc., North Tonawanda, N. Y., has developed a special resin for the rubber industry which has been termed Durez Resin 175, intended for use in connection with semi-hard or hard rubber.

The object of using resin, according to General Plastics, is to obtain a more permanent finish on the rubber than is commonly obtained through other methods, and the amount used depends upon the hardness of the piece desired and runs from about 25% or semi-soft. The incorporation of resin in instances where a large amount is used calls for the compounding of the rubber and other ingredients first, the resin being added on fairly cool mills to prevent the possible setting up of the resin resulting in an insoluble inert compound. When this procedure is followed the full benefit of the resin is obtained.

Resin, of course, is used in rubber as applied to brake linings and friction type of rubber compounds. The procedure described is followed, although often the incorporation of the resin is done in some solution, and the dispersion handled in cement form. The finished product is thus made more resistant to water, oil and air. The advantage of using Durez Resin 175, according to its manufacturer, is that it prevents pitting of the surface of the rubber and adds longevity to the finished product.

Nevinol—A Plasticizer for Rubber

HAVING a viscous liquid consistency and ranking as an intermediate high boiling product between refined coal naphtha and paracoumarone-indene resin, a new coal by-product oil has been developed by the Neville Company, Pittsburgh, Penna., which has been given the tradename of Nevinol. It is a polymer, the characteristics of which suggest its use as a plasticizer in chlorinated rubber coatings and rubber resins, as well as in pyroxalin lacquers, plastic compounds, adhesives, pastes, etc. Nevinol is reported to be an inert liquid of light straw color, compatible with most natural and synthetic gums and resins, and miscible with coal naphthas, petroleum solvents and diluents, alcohols, ester solvents, etc. It has a decided solvent action on rubber, is non-corrosive, and is said to have an exceptionally low saponification number.

Effect of Hydrostatic Pressure

THE values of the dielectric constant, power factor, and conductivity of the insulation surrounding communication cables greatly affect the speed with which the messages may be transmitted and the amount of distortion which the message undergoes. Since submarine cables are sometimes subjected to high hydrostatic pressure, the effect of pressure on the electrical properties of materials which might possibly be used as insulating materials for such cables is of interest.

Research Paper 806 in the July issue of the *Journal of Research*, published by the National Bureau of Standards, presents the results of a study of the effect of hydrostatic pressure on these electrical properties for rubber-sulphur compounds containing from 0 to 32 per cent of sulphur. This is part of a systematic study which has been made at the Bureau on the electrical properties of rubber-sulphur compounds.

The specimens were subjected to hydrostatic pressures up to 700 bars (approximately 690 atmospheres). This is the pressure which is encountered at a depth of about 4.3 miles below the surface of the ocean. For those percentages of sulphur which are generally used in commercial soft-rubber compounds the effect of pressure on the electrical properties is negligibly small. Each of the properties increased with pressure for certain ranges of sulphur content and decreased for other ranges. These results are of interest, aside from any practical value which they may have, because they may contribute to our knowledge of the structure of the rubber.

Moisture-Proof Packing Material

A PATENTED invention which makes possible the production of a moisture-proof packing or wrapping material by joining two or more layers of paper and/or paperboard by means of an intermediate layer of rubber obtained by coagulation and drying of latex is described in the August 20th News Edition of *Industrial and Engineering Chemistry*. For instance, a wrapping paper suitable for the manufacture of bags is produced from two layers of thin sized paper that are glued together by an intermediate layer of unvulcanized coagulated latex. In the same manner a stiff packing material is produced from thick, smooth sulfate cellulose board which has a coating of coagulated latex on both sides that again is covered by layers of thin sized paper. If the stiff inner layer is made from unsized wood pulp board the latex may be mixed with clay or with other substances, such as asphalt or rosin, in order to prevent an undesired impregnation of the fibrous material. The inner layer can also be composed of more layers of paper joined by latex alone or mixed with clay or the other mentioned substances.

Thiokol D

FURTHER development in the field of synthetic rubbers by the Thiokol Corporation, of Yardville, New Jersey, has resulted in the announcement of Thiokol D, an oil proof synthetic rubber with a tensile strength up to 1,700 lbs. per square inch. Although the new product will stand lower temperatures, it is claimed to be very flexible at —45° F. Showing good resistance to high temperatures it will stand hot oil at 200° F. Among the many features claimed by the manufacturer for Thiokol D are the following: elongation around 500%; abrasion resistance of the order of rubber; tear-resistance equal to or better than rubber; mild, not objectionable, odor; and, in addition to being oil proof, has good resistance to Duco thinners, lacquers, printing inks, benzo-gasoline blends and most ordinary solvents. Thiokol D is sold in crude sheet form corresponding to natural crude rubber.

Rubber Division's Fall Meeting

Meeting on September 30- October 1 at Mayflower Hotel in Akron Will Feature 10 Papers, Election and Banquet

TEN interesting papers will feature the annual Fall meeting of the Rubber Division, A.C.S., at the Mayflower Hotel, Akron, O., Monday afternoon, September 30, and Tuesday morning, October 1. As usual discussions will be held after the presentation of each paper. Seven papers will be given at the Monday session, which is scheduled to start at 1:00 P.M., the remaining three being scheduled for the Tuesday session which starts at 9:00 A.M. The annual banquet of the Rubber Division will be held on Monday evening, September 30, at 7:00 P.M. in the Ballroom of the Mayflower Hotel. Preceding the regular business meeting at which officers for the coming year will be elected, the Crude Rubber Committee, appointed at the close of the last meeting, will render its first report. Program and abstracts of the papers to be presented follow:

PROGRAM OF FALL MEETING
MAYFLOWER HOTEL, AKRON, OHIO
Monday Afternoon—September 30

1:00—AXF—A New Plastic Material. *S. D. Shinkle, A. E. Brooks, and G. H. Cady.*

A new class of elastic materials which are very resistant to the action of many solvents and chemical reagents may be prepared by reacting an ethylene dihalide in the presence of aluminum chloride with an aromatic hydrocarbon having the general formula $R\text{-}C_6H_4\text{-}R_1$. R and R_1 each stand for hydrogen or an aliphatic hydrocarbon radical containing two or more carbon atoms. The properties of the plastic make it especially interesting as a compounding ingredient for use with natural or synthetic rubber.

The resistance to ozone cracking, the flexibility, and the breaking elongation of oil and gasoline resistant semi-hard rubber stocks containing 15 to 20 parts of sulfur per 100 of rubber may be increased by the addition of AXF to the compound. A moderate amount of flexibility and stretch is possessed by hard rubber made from equal weights of rubber and AXF.

As a compounding material with DuPrene, AXF is superior to factice in several ways. For instance, it yields a product more resistant to the action of gasoline and oils. AXF has an excellent plasticizing action both on DuPrene and on the ethylene polysulfide plastics known as Thiokol. With the latter, its inertness causes it to be preferred to rubber for use in this capacity.

1:15—Oxygen Absorbers and Their Effect in Rubber. *A. A. Somerville.*

The cracking of vulcanized rubber, in particular rubber compounded with carbon black, when subjected to oft-repeated dynamic strain is discussed, and a new, chemical means of reducing flex-cracking tendency is described. The new method consists in the addition to the rubber compound of organic materials which absorb oxygen in the presence of a base, and is founded on the theory that oxygen dissolved in the rubber and adsorbed or otherwise held by compounding ingredients such as carbon black plays a part in the causation of flex-cracking and should be removed.

The conditions under which these oxygen absorbers are most effective are described, and the results obtainable from pyrogallol-ethanolamine and pyrogallol-quinol-ethanolamine combinations are shown. Factors which influence the tendency to flex-crack, such as the amount of carbon black and the sulfur ratios used are discussed, and a laboratory method of evaluating flex-cracking is described.

1:50—Effect of Different Temperatures and Oxygen Pressures on Rate of Aging of Soft Vulcanized Rubber. *J. H. Ingmanson and A. R. Kemp.*

It is of great importance to the manufacturer and consumer of rubber goods to have available suitable standardized accelerated aging tests whereby the life of rubber articles may be predicted under the variable storage and service conditions encountered. In general, the Bierer and Davis oxygen bomb test has proved to be most suitable for this purpose.

Studies carried out show that the rate of aging of rubber does not vary in direct ratio with change in oxygen pressure. Little difference is found in the rate of aging at 50 or 100 lbs. and 300 lbs. per square inch oxygen pressure. Increased temperature, however, causes increased aging rate. It appears that the quantity of rubber aged in the bomb at one time does not affect aging rate nor does periodic changing of the oxygen cause aging variations. The aging of stocks containing various antioxidants at one time or together with stocks containing no antioxidants may cause variations in aging rate.

The air bomb test appears to be extremely useful in predicting the life of inner tubes. However, its general use offers certain hazards because of the high temperatures employed. A restandardization of the oxygen pressure test using lower pressures would make possible the use of less cumbersome equipment than is now used and should eliminate the need for the many safety precautions with which the test method is now surrounded. More rapid aging rates can be attained by slight increases in temperature without increasing hazards of the test appreciably.

2:15—The Chemistry of Soft Rubber Vulcanization. V. Experiments on the Treatment of Dilute Rubber Cements with Sulfur Chloride. *B. S. Garvey, Jr.*

The results of these experiments indicate that the main vulcanizing effect of sulfur chloride is a reaction other than addition to the hydrocarbon. Although the individual molecules appear to undergo this reaction, no vulcanized structure is established when the molecules are separated from one another. This structure is apparently established by mechanical interlocking of the molecules. The results are explained by two assumptions: (1) that sulfur chloride catalyzes geometrical rearrangement at some of the double bonds causing kinking of the molecules and (2) that, under favorable conditions, the molecules again become straight by rotation at single bonds under the influence of thermal agitation.

2:40—Notes on the Determination of Sulfur in Rubber Compounding. *C. Herbert Lindsly.*

A description of the use of picric acid as an aid in determination of sulfur as barium sulfate. The addition of picric acid to the sulfate solution prior to the addition of barium chloride eliminates the necessity of prolonged digestion before filtration.

3:10—A Rapid and Practical Method for the Determination of Free Sulfur in Rubber. *E. W. Oldham, L. M. Baker and M. W. Craytor.*

An accurate and rapid method of determining free sulfur in rubber. By the use of the procedure described, it is possible to determine the free sulfur in a soft rubber sample in less than three hours' time.

3:35—An Impact Cutting Test for Tire Tread Stocks. *J. H. Dillon.*

The problem of tire tread cutting is discussed in relation to the various measurable characteristics of rubber stocks such as tear resistance, cracking resistance, and hardness. Theoretical reasons are given for selecting a high speed, high load, knife-

impact test for the laboratory evaluation of the cutting resistance of tread stocks. The impact cutting device used in this work is described in detail and results obtained with it are discussed in their relations to the physical variables involved, compounding trends and road tests.

7:00—Rubber Division Banquet—Mayflower Hotel Ballroom.

Tuesday Morning—October 1

9:00—The Determination of Guanidines in Rubber Stocks and the Consumption of Guanidines During Cure. *Bingham J. Humphrey.* .

1. When an uncured stock containing D.P.G. or D.O.T.G. is extracted with acetone the guanidine is not completely removed. This is also true of a mixture of guanidine in acetone-extracted rubber.

2. Because the guanidine may be completely recovered when the uncured stock is treated with a weak hydrolizing agent, such as very dilute acid, it is believed that a compound is formed between a part of the guanidine and some ingredient of the crude rubber.

3. This compound or addition product is gradually destroyed during the cure, but exists well beyond the optimum cure. In cured stocks, acetone extraction does not recover this bound guanidine.

4. A new analytical method of determining guanidines has been developed involving a hydrolytic treatment of the stock with benzene and dilute hydrochloric acid. This method removes the combined guanidine and, in general, gives higher, more consistent, and more satisfactory results.

5. A range of cures of different stocks has been analyzed both by this method and by the Wistinghausen (acetone-extraction) method, in order to compare the accelerator consumption curves obtained by each method.

9:25—Diffusion of Water Through Rubber, Synthetic Resin, and Other High Polymeric Materials. *R. L. Taylor, D. B. Herrmann, and A. R. Kemp.*

Measurements have been made on the rate at which water passes through various organic insulating materials including hard and soft rubber, submarine cable insulation, phenol fibre and similar materials, cellulose acetate and related substances, asphalts and pure hydrocarbons such as polystyrene, balata, and petroleum wax.

A diffusion constant has been calculated for each by means of Fick's linear diffusion law. This method of expressing the rate of diffusion permits the comparison of one material with another and possesses many advantages from a practical standpoint. If, for example, the diffusion constant for a material is known, it is possible to calculate the thickness necessary to protect a given piece of apparatus, or the time during which a given thickness will be effective, under known conditions of temperature and humidity. The diffusion constant is particularly applicable to calculations involving insulations in various geometric forms such as that on a cable. Equations have been derived covering the more common geometric forms and the more usual conditions.

The data presented show a variation in the diffusion constant of different organic materials ranging from 6.2×10^{-10} for a hydrocarbon wax to 1.6×10^{-5} gm/hr./Hg for cellulose acetate.

The rate of diffusion through non-sorbing materials was found to vary inversely with the first power of the thickness, while the rate through sorbing materials was found to deviate from the first power due to retention of moisture and to the establishment of a non-linear concentration gradient.

The rate of diffusion through non-sorbing materials is shown to vary directly with the vapor pressure but in the case of sorbing materials to be influenced by the distribution of water within the sample. It is also shown that the rate of diffusion is linearly proportional to the vapor pressure at pressures below that of the water soluble constituents in rubber and to deviate markedly from linearity at pressures above.

Measurements were made on the amount and distribution of water in rubber under diffusion conditions. The percentage moisture retained was found to increase with thickness and to be distributed in accordance with established concentration-pressure relationships.

Various concepts involving sorption and diffusion processes are discussed as bearing upon the mechanism of moisture diffusion through organic substances.

9:40—Raman Spectrum of Rubber and Some Related Hydrocarbons. *S. D. Gehman and H. J. Osterhof.*

A Raman line spectrum has been secured for rubber and balata by using cvlear gels of the purified hydrocarbons. It was not found possible to eliminate the backgrornd entirely. The most intense frequency for both rubber and balata is the same, 1672 cm^{-1}, ascribed to the double bond.

Comparison of the frequencies for rubber and balata with those of trimethyl ethylene, myrcene, isoprene, and limonene shows that the primary linkages in rubber are very similar to those in trimethyl ethylene, thus supporting the view that the rubber molecule consists of a long chain of isopentene units. The spectrum of balata shows differences from that of rubber such as might be expected from a cis-trans relationship.

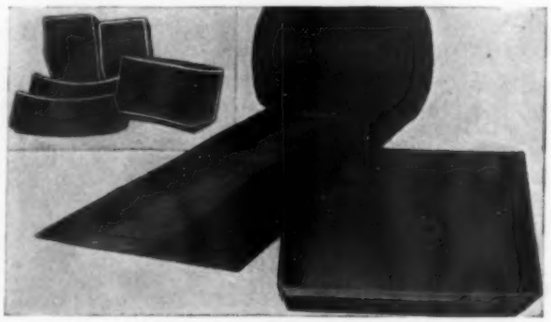
A spectrum of myrcene is largely a superposition of the isoprene and trimethyl ethylene spectra.

10:00—Report of Crude Rubber Committee.

11:00—Business Meeting. (Election of Officers.)

Self-Vulc Rubberizing Compounds

TWO types of rubberizing compounds, under the trade name of Self-Vulc, one in liquid form, the other in plastic form, have been developed by the Self-Vulcanizing Rubber Company, Inc., of 605 W. Washington Boulevard, Chicago. Recent improvements in the liquid rubber are said to have resulted in the production of a new priming



compound which makes good results possible by the application of a single priming coat. The liquid rubber can be brushed, sprayed, dipped or poured on surfaces, similar to the application of paint. The rubber vulcanizes when exposed to air. The Self-Vulc plastic rubber is applied with a spatula or other flat tool and also requires only one prime or preliminary coat, vulcanizing itself cold on air exposure. These compounds may be used to protect inside and outside surfaces against abrasion, corrosion and acids, as well as to waterproof all kinds of containers. Another suggested use is to restore surfaces of materials which have been worn away by abrasive actions. The illustration shows a tank lined with Self-Vulc, a conveyor belt repaired with it, and several metal parts coated for protection against abrasion.

Liquid Latex Compounding

IT IS occasionally desirable to mix water glass or glue and similar materials with liquid latex. Unless certain precautions are taken these materials cannot be mixed with the latex without immediately or eventually coagulating it. The addition of ammonia to the latex and in some cases to the compounding material (that is, water glass or glue, etc.) in proper amounts will prevent this coagulation. This applies of course to both vulcanized and unvulcanized latex.—*R. R. Olin Laboratories.*

Effect of Antioxidants on the Natural and the Accelerated Aging of Rubber

By Rees F. Tener and William L. Holt

CONCLUDED herewith is the paper describing a study of the effect of several commercial antioxidants on the deterioration of typical, soft rubber compounds when exposed to various conditions, as conducted over a period of years by the National Bureau of Standards, the first half of which appeared in the preceding issue. Tensile and time indexes referred to in the following text are depicted in Figure 1 which appeared in the first part. In Figures 8 to 11, in which the results of tests are given graphically, the letter O indicates base compound (no antioxidant); the letters A, B, C, etc., refer to antioxidants listed in table 1 (published in the preceding issue); and the subscript o indicates an overcured compound. Conclusions drawn from the many tests follow. (EDITOR).

1. TENSILE INDEX

The tensile index is the ratio of the areas under the aging curves of samples made with and without an antioxidant when a definite period of aging is considered. Referring to figure 1 (A), the curve *ab* represents the aging behavior of rubber containing an antioxidant, and the curve *ac*, the aging of rubber of the same composition containing no antioxidant. The ratio of the area *abde* to the area *acde* represents the improvement in tensile strength, during a definite time interval, resulting from the use of the antioxidant. If it is assumed that the tensile strength is related to other practically useful properties, such as resistance to abrasion, the tensile index becomes a factor of general importance in evaluating antioxidants. In the case of automobile tires, for example, it is not necessary that the rubber be well preserved over the longest possible period of years. The majority of tires are worn out in two or three years, and the primary function of an antioxidant in tires is to maintain the rubber in the best possible physical condition during a relatively short and fairly definite period.

2. TIME INDEX

For certain other types of rubber goods, however, the desideratum is to maintain the rubber in a reasonably good physical condition over the longest possible period of time, and in such cases the time index is the more suitable measure of the efficiency of an antioxidant.

The time index is the ratio of areas between aging curves, and a line representing the minimum useful tensile strength of the rubber. In figure 1 (B), for illustration, *mn* represents the aging of rubber containing an antioxidant, and *mp* the aging of rubber containing no antioxidant, and the line *on* arbitrarily represents the tensile strength below which the rubber is no longer useful. The time index is the ratio of the areas *mno* and *mpo*.

It may appear that an equally satisfactory result would be obtained by making a comparison of the time required for the rubber samples with and without the antioxidant to reach the limiting useful tensile strength. Such would be the case if the tensile strength of the rubber and other characteristics (as, for instance, resistance to tearing or abrasion) of which it is an index were immaterial so long as the tensile strength exceeded a minimum value. However, an antioxidant which results in a relatively high tensile strength for the rubber throughout its life would usually be preferred to one which maintained a low tensile strength even though they should both give the same intercept on the minimum tensile line. This may be illustrated by reference to figure 1 (C). The curves *xyz* and *xvz* represent the aging behavior of rubber containing two different antioxidants and indicate the same span of useful life for the rubber. The antioxidant which gave the former curve would be chosen in most cases and, in keeping with this, the time index of the former antioxidant would be greater than that of the latter.

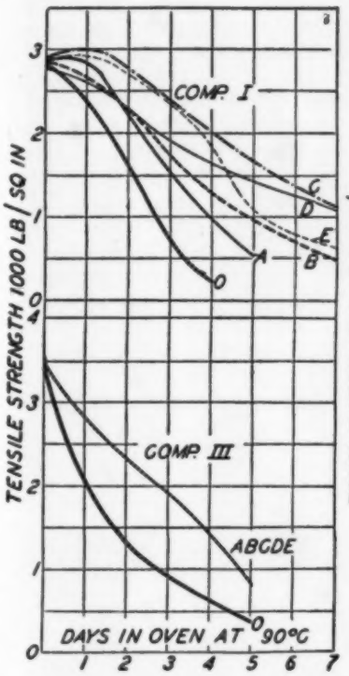


Figure 8. — Tensile-strength-time curves for compounds I and III exposed to the 90° C. oven test.

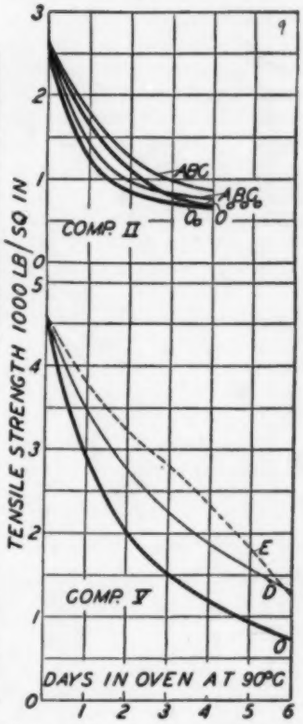


Figure 9. — Tensile-strength-time curves for compounds II and V exposed to the 90° oven test.

3. COMPUTATION OF TENSILE AND TIME INDEXES

Tensile and time indexes were determined from the curves shown in the figures, the areas under comparison being measured by plotting on cross-section paper. Tensile indexes were computed for the entire period of the test, which, in most cases, was conducted to a point where the sample containing no antioxidant had a relatively low tensile strength. If the designed life of a rubber article were fairly well known, the end-point would be chosen accordingly.

Time indexes were computed on the basis of the time at which the tensile strength of the compound containing an antioxidant reached a certain lower limit. This lower limit was either 1,500, 1,750, or 2,250 pounds per square inch, depending on the compound under consideration. These figures were selected somewhat arbitrarily and represent approximately one-half of the initial tensile strengths. In computing the time indexes, some of the aging curves were extrapolated for a short distance to bring them to the lower limit. This was done, however, only where the trend of the curve was fairly well established and the additional area so added was relatively small.

Since different lower tensile boundaries were used in computing the time indexes in the various tests, the values of the indexes here given are not closely comparable. The logical way to determine the time index would be to conduct aging tests to the point of failure for the compound containing antioxidant as well as the one containing no antioxidant, and to compare the complete curves so obtained. Inasmuch as complete curves were not obtained in the present investigation, the computations utilized the available data to the fullest possible extent. This is what is done when a visual comparison is made of incomplete aging curves, and the indexes given are merely ratios designed to give definite expression to comparisons which could otherwise be made only vaguely when many samples are examined. Any attempt to limit the curves and make strictly logical comparisons of all aging tests would have the effect of discarding a considerable amount of useful and pertinent information, and would thus decrease the scope and value of the results taken as a whole.

The tensile and time indexes corresponding to the aging curves shown in the figures are listed in table 5.

TABLE 5.—*Time and tensile aging indexes of rubber compounds containing antioxidants.*

[The composition of the compounds is given in table 2; the names of the antioxidants are shown in table 1. The results for compounds I, III, and V are the average for three cures, except that for compound III with antioxidants A, B, C only the optimum cure was employed; the results for compound II are the average for the undercure and the optimum cure, while those for compound II$_o$ are for the overcure]

Compound	Antioxidant	Time index: Dark storage	Time index: Weather	Time index: Oven at 70° C	Time index: Oven at 90° C	Time index: Oxygen bomb	Time index: Average	Tensile index: Dark storage	Tensile index: Weather	Tensile index: Oven at 70° C	Tensile index: Oven at 90° C	Tensile index: Oxygen bomb	Tensile index: Average
I	A	(*)	1.6	2.1	1.7	2.3	1.98	1.1	1.3	1.4	1.4	1.5	1.34
	B	(*)	3.0	4.2	1.9	5.1	3.72	1.3	1.5	1.8	1.6	2.0	1.64
	C	(*)	3.9	4.2	3.1	4.7	3.97	1.3	1.6	1.8	1.9	1.9	1.70
	D	(*)	3.0	3.3	1.9	4.1	2.80	1.1	1.3	1.5	1.6	1.9	1.48
	E	(*)	4.5	3.4	2.9	5.6	4.10	1.3	1.7	1.8	1.8	2.0	1.72
Average				3.24	2.23	2.30	4.36	3.30	1.22	1.48	1.66	1.66	1.86	1.58
III	A	(*)	4.9	1.4	2.8	1.2	2.57	1.2	1.5	1.2	1.5	1.1	1.30
	B	(*)	5.6	2.7	2.6	1.2	3.13	1.3	1.7	1.6	1.5	1.1	1.44
	C	(*)	5.8	2.8	2.8	1.7	3.20	1.4	1.7	1.5	1.5	1.2	1.46
	D	(*)	3.1	2.0	2.8	1.7	2.49	1.3	1.3	1.4	1.5	1.3	1.38
	E	(*)	6.0	2.1	2.8	1.6	3.67	1.3	1.9	1.4	1.5	1.3	1.48
Average				5.72	2.14	2.80	1.48	3.03	1.30	1.62	1.42	1.50	1.20	1.41
II	A	2.7	1.9	2.4	1.9	4.5	2.65	1.7	1.2	1.3	1.1	1.8	1.42
	B	3.2	1.9	2.4	1.9	4.8	2.94	1.8	1.2	1.3	1.1	1.8	1.44
	C	1.7	1.9	1.6	1.9	3.1	2.04	1.3	1.2	1.1	1.1	1.5	1.24
Average		2.53	1.60	2.13	1.60	4.13	2.52	1.60	1.20	1.21	1.10	1.70	1.36
II$_o$	A	4.0	2.6	2.7	1.3	3.6	2.86	1.6	1.4	1.3	1.2	1.7	1.42
	B	3.2	3.3	1.5	1.3	5.0	2.94	1.8	1.6	1.2	1.2	1.7	1.30
	C	1.0	1.1	1.2	1.3	1.0	1.13	1.2	1.1	1.1	1.2	1.0	1.12
Average		2.73	2.30	1.80	1.30	3.35	2.29	1.53	1.40	1.20	1.20	1.46	1.28
V	D	(*)	1.0	1.6	1.5	4.7	2.20	1.5	1.1	1.3	1.3	2.3	1.50
	E	(*)	1.7	2.1	2.1	6.9	3.20	1.6	1.2	1.6	1.4	2.6	1.68
Average				1.35	1.85	1.80	5.80	2.70	1.55	1.10	1.45	1.35	2.45	1.58
Grand average		(*)		2.90	2.33	2.02	3.81	2.77	1.44	1.38	1.39	1.36	1.73	1.46

* Deterioration of samples in eight years was not sufficient to warrant the computation of a time index. Under these circumstances the value of the index is evidently quite high.

4. GENERAL EFFECT OF ANTIOXIDANTS

An examination of the data in table 5 and of the figures from which they were derived indicates that the antioxidants increased the strength and durability of rubber under all the circumstances that were investigated. The improvement in tensile strength is indicated by a tensile index which is as high as 2 or more in exceptional instances, and averages 1.46 for all tests included in the investigation. The increase in the life of the rubber, as measured by the time index, was too high to be determined in the case of compounds I, III, and V when stored in the dark. It amounted to as much as 5 or 6 under several conditions, and averages 2.77 for the numerical values that were recorded.

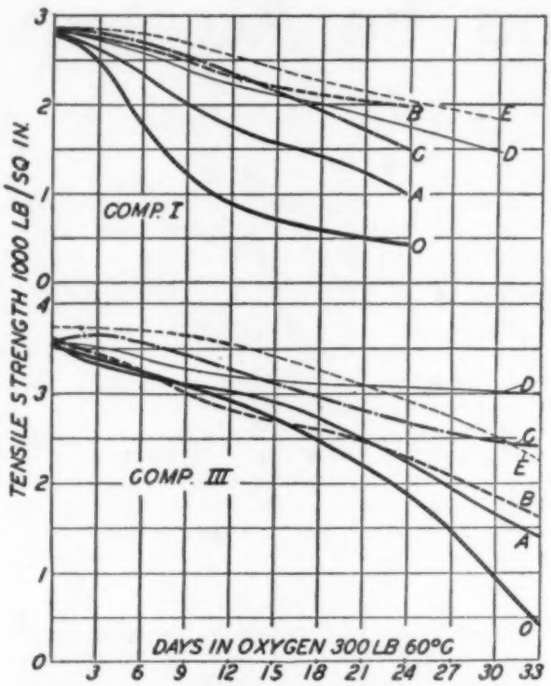


Figure 10.—Tensile-strength-time curves for compounds I and III exposed to the oxygen-bomb test.

5. BEHAVIOR OF ANTIOXIDANTS IN DIFFERENT COMPOUNDS

An inspection of the average indexes indicates that the antioxidants are somewhat more effective in compounds I, III, and V than in compound II, though under some conditions some of the antioxidants are quite effective in compound II. In the case of the rubber-sulphur compound IV, the measurements are not shown. All the antioxidants were effective in increasing the durability, but they were not a cure-all for the mediocre aging properties which characterize rubber-sulphur compounds under most circumstances. Taken as a whole, the effectiveness of antioxidants depend not so much on the nature of the compound as on the conditions of aging to which the compound is exposed.

6. BEHAVIOR OF ANTIOXIDANTS UNDER DIFFERENT CONDITIONS OF EXPOSURE

An examination of the data in table 5 also indicates that the conditions under which the rubber samples were exposed caused the largest variations in the indexes. If *average* values of indexes for all compounds are considered, the effectiveness of antioxidants may be ascertained for the different conditions of exposure. These are arranged in the order of their decreasing effectiveness (antioxidants were most effective under condition 1, and least effective under condition 5) as follows:

Condition	Time index	Condition	Tensile index
1	Dark storage	1	Oxygen bomb
2	Oxygen bomb	2	Dark storage
3	Exposure to weather	3	Oven at 70° C
4	Oven at 70° C	4	Exposure to weather, or
5	Oven at 90° C	5	Oven at 90° C

As indicated above, the order differs somewhat, though not radically, depending on whether the time index or the

tensile index is taken as a criterion of deterioration.

In general, all the antioxidants show a similar response to the various conditions of exposure. Compound III differs from the other compounds, in that antioxidants had the least effect during aging in the oxygen bomb and the most effect during weather exposure. In the weather-exposure tests, the greater effect in compound III, which is transparent, and in compound I, which is light in color, can be explained by the darkening effect of the antioxidants. (Compounds II, II_o, and V were initially dark in color). Reference to table 1 shows that the protection afforded by antioxidants under weather exposure is in accord with the darkening produced by them, which indicates that light was the chief deteriorating agent.

The relatively high degree of protection which antioxidants afford against deterioration in the oxygen bomb, in most cases, is an indication that their primary function, in keeping with their name, is that of negative catalysts of oxidation. Only in the case of compound III do the antioxidants fail to bring about a very considerable improvement when aging is conducted in the oxygen bomb. An examination of the results reveals no explanation for this behavior.

The results obtained under different conditions of exposure have a direct bearing on the matter of accelerated-aging tests. Consider, for example, the testing of a rubber product for use where exposure to weather is the chief deteriorating factor. If the average indexes for each compound are classified with reference to the accelerated-aging test, which most nearly corresponds to weather exposure, the tabulation shown in table 6 results.

TABLE 6.—*Most suitable accelerated test for weather exposure, based on time and tensile indexes*

Compound	Time index	Tensile index
I	Oven at 70° C.	Oven at 70° or 90° C.
III	Oven at 90° C.	Oven at 90° C.
II	Oven at 90° C.	Oven at 70° C.
[a] II_o	Oven at 70° C.	Oxygen bomb.
V	Oven at 90° C.	Oven at 90° C.

[a] Overcure of II.

This tabulation points to the oven test at 90° C, a test not commonly employed, as being the one of those tried which was most nearly comparable to weather exposure. The oxygen-bomb test, in most cases, would indicate a relatively greater durability than would be found for rubber exposed to weather.

If a rubber product is to be used where conditions similar to those encountered in dark storage are the chief deteriorating factors, accelerated-aging tests which would show the best correspondence are given in table 7.

TABLE 7.—*Most suitable accelerated test for dark-storage conditions based on time and tensile indexes*

Compound	Time index	Tensile index
I	Oxygen bomb	Oven at 70 or 90° C.
III	Oven at 90° C	Oxygen bomb.
II	Oven at 70° C	Do.
[a] II_o	Oxygen bomb	Do.
V	do	Oven at 70° C.

[a] Overcure of compound II.

This tabulation points to the oxygen bomb as being the most suitable test in the majority of cases, while one of the oven tests is indicated for the other cases.

7. RELATIVE VALUE OF ANTIOXIDANTS

The several antioxidants differ considerably in protective action, but the variations are not sufficiently systematic or uniform to admit of arranging them in any general order of efficiency. Furthermore, the data are not complete in this respect, because all five antioxidants were used simultaneously in only two compounds. Inasmuch as the results obtained in the case of these two compounds were not consistent, they do not warrant the placing of any general rating on the five antioxidants.

Antioxidants A, B, and C were used comparably in three compounds, I, II, and III, as were also antioxidants D and E, in compounds, I, III, and V. In compounds I and III, the antioxidants, arranged in order of decreasing protective action, were C, B, A, but in compound II the order was B, A, C, or A, B, C. In the general average B and C are close together, while A is somewhat lower, but the variability of the results with different compounds is such that the results are not highly significant.

A comparison of antioxidants D and E leads to more consistent results. Only in one test did antioxidant D show a higher protective value than did E. The numerical results, however, show no consistent ratio between the two antioxidants.

In making comparisons between compounds containing different antioxidants, consideration should be given to the relative amounts of each antioxidant used. As stated previously, the proportions employed in the present work were based on the recommendations of the manufacturers at the time tests were started. No experiments were conducted to determine whether the amounts employed were the most effective or the most economical.

1. All antioxidants increased the useful life of rubber compounds under practically all of the conditions of test.

2. The effectiveness of the antioxidants varied between wide limits, depending upon the conditions of exposure, the type of compound, and the particular antioxidant used.

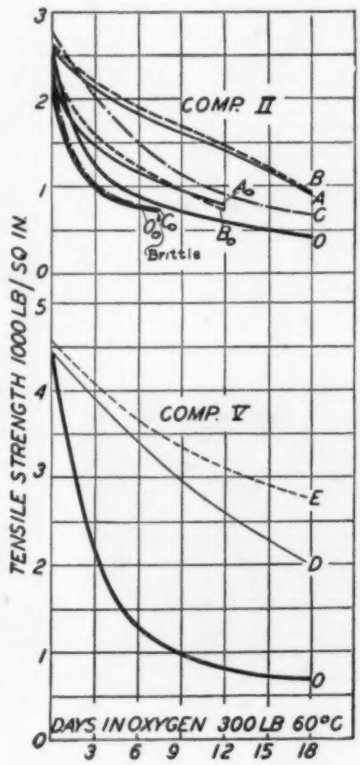


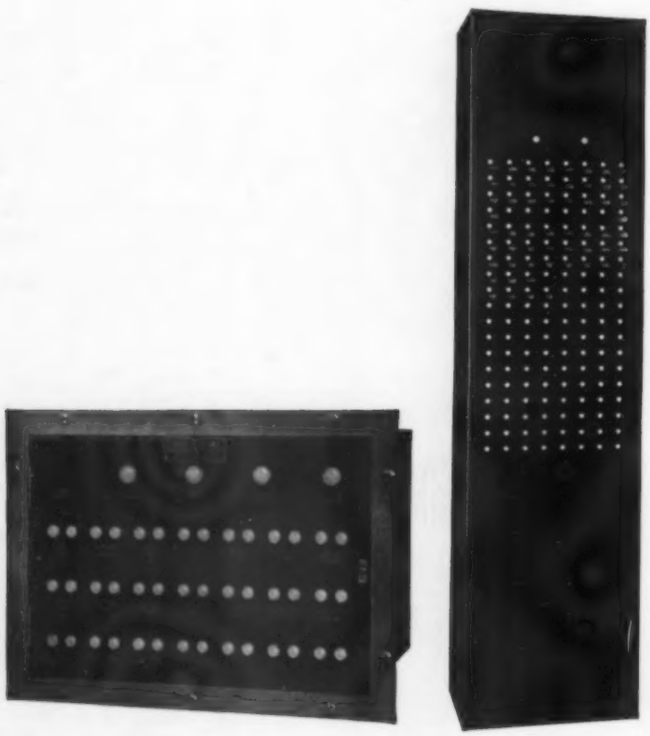
Figure 11.—Tensile-strength-time curves for compounds II and V exposed to the oxygen-bomb test.

3. Two means for expressing the effectiveness of an antioxidant numerically are suggested, a *time index*, which is a measure of the increase in time during which a rubber compound will remain serviceable, and a *tensile index*, which is a measure of the improvement in average tensile strength. A comparison of the indexes obtained by different accelerated-aging tests with those obtained under some conditions of natural aging, affords a means for choosing an aging test best suited to a particular rubber product.

New Equipment

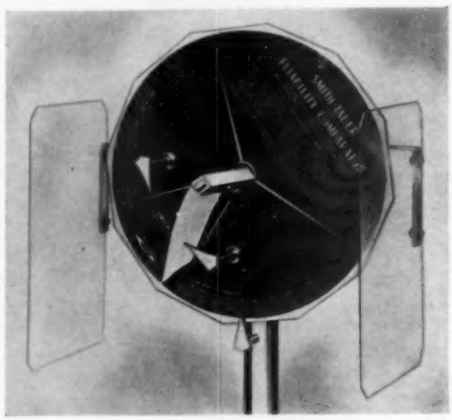
Kellogg Annunciator Units

CONTROL of temperature, flow, liquid level, pressure, and other movements, is an important factor in the operation of processes employed in the rubber industry. The use of annunciator units, which may be termed signalling or recording devices, enhances control possibilities by immediately detecting changes in pressures, levels, speeds, vibration, and other movements. Signal lamps may be arranged to operate from continuous contacts such as those occurring as a result of a rising liquid level or temperature change. They may also operate from momentary contact as might occur in the case of a circuit breaker or other transient phenomena. Two or more lights may be assigned to indicate two or more conditions. The lights may remain burning so long as a faulty condition exists or may be designed so that they can be extinguished and caused to re-appear by a repetition of the observed condition. Annunciators may be operated from photo-cells and will monitor the operation of other equipment which is photo-cell controlled. In addition to the lighting system, annunciator units may be made to ring alarm bells, and other styles of signals. The units illustrated herewith, products of the Kellogg Switchboard and Supply Company, of Chicago, are generally assembled in steel cabinets to match other existing panels in the factory to be equipped. They may be self-contained (as seen here) or designed to fit into existing gauge or control boards. Accessibility is featured in all types of Kellogg annunciator units which are made as nearly fire-proof and dust-proof as possible.



Smith-Taber Pliability Comparator

PROVIDING a means of checking and controlling quantitative and qualitative factors relating to the pliability of textiles, thin papers, transparent wrappings, suede leather, and other light materials, a Pliability Comparator has been announced by the Smith-Taber Company, North Tonawanda, N. Y. Its uses and economies include: setting up and control of sizing operations; checking laboratory runs made in advance of mill production; determination of the effect of various weaves and twists affecting pliability of fabrics; effect of Sanforizing and other shrinking processes on pliability of material; determining the most suitable thickness of transparent wrapping material for various sizes and shapes of packages wrapped by hand or automatic packaging machines. The instrument is built to precision standards and has no delicate parts to wear or lose adjustment during laboratory or shop use. It is quick and easy to operate and gives a check both with and against grain or warp and fill of material being tested.



Schrader Quick Acting Couplers

ESPECIALLY adaptable for attaching and disconnecting airline equipment, A. Schrader's Son, Brooklyn, New York, has introduced a line of quick acting couplers. Grease guns, spray guns, car lifts, air chucks, blow guns, chuck gauges, etc., may be interchanged at one or several pipe outlets, as well as at the working end of the hose, in a few seconds. The couplers are made of cadmium plated steel and are said to be airtight with a free flow of air when in operation. The working parts are a tripping deflator and a rubber washer, replaceable when worn from service. The check unit contains automatic shut-off parts.

REVIEW SHELF

• Monthly Review of New Books, Pamphlets, Company Catalogs, Service Bulletins, House Organs, etc., Pertinent to the Industry

RUBBER—PHYSICAL AND CHEMICAL PROPERTIES. Compiled by T. R. Dawson and B. D. Porritt, with a foreword by Sir Herbert Wright. Published by The Research Association of British Rubber Manufacturers, Croydon, England. 700 pp. 45 Shillings.

Based on the need for some work of reference giving all the available scientific and technical data relating to rubber in its many varied forms the Research Association of British Rubber Manufacturers, in cooperation with the Rubber Growers' Association, under the supervision of Messrs. Dawson and Porritt, head of the Information Bureau and director, respectively, of the Research Association, started in January, 1933 to compile the needed information which has resulted in the publication of this reference work, which is the most complete compilation published on the subject. An idea as to the value of *Rubber—Physical and Chemical Properties* may be realized from the fact that it contains data from upwards of 1,400 papers, pamphlets and books, while its subject index contains some 300,000 references. Most of the data is modern, dating from 1920, but none of the important classical researches has been neglected.

The specific purpose of the book is to present a set of tables of detailed quantitative data of the properties of rubber, so far as available information allows, together with chapters dealing with other aspects of the properties of rubber. Although consisting of numerous chapters and sub-chapters, the tabulated data is presented under six principal headings, viz: Latex, Coagulum, Raw Rubber, Soft Vulcanized Rubber, Sponge and Cellular Rubber, and Hard Rubber (Ebonite). The chemical and physical properties of each of these subjects is treated generally, with the physical properties including mechanical, thermal, electrical, and optical data, behavior as a solvent in some cases and towards solvents and gases in others. Wherever the data permits the arrangement of a table for a given single property it is discussed from the standpoint of being affected by external conditions, composition of the material, and aging of the material.

Rubber manufacturers, particularly, will find the work of intense value. The detailed results of the effects and behavior of scores of compounding ingredients clarify a complex subject as simply as possible. The tabulated matter bears on all of the special phenomena related to vulcanization, aging, and on the variability of the primary raw material.

It is also the aim of the two cooperating associations to more thoroughly acquaint the consumer of rubber goods with the special properties of rubber as it affects their particular use of it. Users of hose, for instance, coming in contact with foodstuffs, spirits, milk, vinegar, fruit, etc., should have a better working knowledge of rubber, which this reference work gives by including definite numerical answers in the tabulated data.

Because of the lack of information about changes in the less usually studied properties during the aging of rubber, this subject has been given particular attention by the compilers. Throughout the book the aging of rubber is regarded as a factor modifying each property and wherever available tables are given following those on the effects of composition. This section of each property also includes such subjects as the effects of preservative paints, storage conditions, the effects (on electrical properties) of soaking in water, and any other deteriorating or preserving treatments for which information has been found. Unfortunately, due to inadequate literature many desirable details regarding exact mixing and vulcanizing conditions are missing from the chapter on sponge and cellular rubber.

Rubber test results are very sensitive to small differences in technique and rigid standardization of methods is essential if different laboratories are to agree on results. The recommended methods stressed in the book arise from a critical study of the best available standard methods, backed by the experience gained from numerous applications of testing methods.

Rubber—Physical and Chemical Properties merits a position in the library of every rubber chemist, technologist and research worker, as one of the best available reference works in existence. It is interesting to note that the book is printed on latex paper.

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STANDARD APPLIANCES FOR ANTI-FRICTION BEARING MOUNTINGS. Distributed by the Bearing Appliance Company, Ardmore, Pa.

This bulletin consists of 12 pages and presents a line of covers and other types for use with a wide range of bearing types and sizes. Various style covers, such as open covers with flingers and open covers with felt closures, are grouped in tables and listed, showing the group and part number. The majority of the booklet is devoted to these listings.

PETROLEUM—THE STORY OF AN AMERICAN INDUSTRY. Prepared and published by the American Petroleum Institute, 50 West 50th Street, New York City. 95 pp. 15 cents.

Representing the second edition of the booklet "Oil," published by the American Petroleum Institute in 1930, this latest edition is larger and answers many questions which have arisen since publication of the original booklet. The purpose of "Petroleum" is to tell, in simple terms, of the operations and services involved in the transformation of this natural resource into useful products, a purpose it successfully accomplishes. A detailed description of the industry's numerous operations, services and products would, of course, require a mammoth volume. Of particular interest to the rubber industry is the chapter on "Uses of Petroleum Products" which includes brief descriptions of distillates and residues.

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METALINE OILLESS BEARINGS. Distributed by the Spadone Machine Company, Inc., 122 East 25th Street, New York City. 4 pp.

This little pamphlet briefly and clearly describes and illustrates the construction method and typical installations of Metaline Oilless Bearings. The principle of Metaline lubrication is explained in a few short paragraphs. The protection of rubbing surfaces with Metaline plugs is also discussed. A table depicting the inside and outside diameters of the oilless bearings is given.

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CINDER RECLAIMING AND FLY ASH DISPOSAL. Distributed by the United Conveyor Corporation, Old Colony Bldg., Chicago. 16 pp.

Three functions of the Steamatic system developed by the United Conveyor Corporation, viz: vacuum sweeping for the power plant, fly ash and soot conveyor for rear passes, breeching, etc., and cinder reclaiming, are explained and described in this attractively printed booklet. Conveyor layouts in various factories are graphically depicted, while special close-up photographs are used to point out the superior points of the systems. The booklet should be of interest to powerhouse superintendents.

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SKF BALL AND ROLLER BEARING TRANSMISSION APPLIANCES. Issued by SKF Industries, Inc., Philadelphia, Penna. 32 pp.

According to this catalog there are more than 11,000,000 SKF bearings in transmission equipment in world-wide use today. The catalog shows load ratings and diagrams of mountings for the ball and roller bearing pillow blocks featured by the company, as well as for flanged housings, take-up boxes, floor stands, etc. Several pages are devoted to a discussion of bearing problems, aids in the selection of ball and roller bearings, and dimensional and load data. A price list accompanies the catalog.

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FRANCKE FLEXIBLE COUPLINGS. Catalog No. 50. Issued by the John Waldron Corporation, New Brunswick, N. J. 12 pp.

Describing and illustrating the changes which have recently been made in the Francke flexible coupling line, this catalog is issued coincident with the new sales policy recently inaugurated by the John Waldron Corp. whereby the couplings and replacement parts are now offered directly by the company. In addition to describing the changes in design and materials, the catalog also gives complete tables of sizes for the various types, full directions for size selection and coupling service factors.

Editorial Comment

Conflicting Statistics

TWO surveys were recently conducted by independent interests to determine the outlook of the tire industry this coming Fall and Winter. Each survey reached different conclusions. One, conducted by the Standard Statistics Company, arrives at the conclusion, among others, that replacement of worn out tires will be somewhat below the total for 1934. The other, sponsored by the brokerage house of Jackson & Curtis, sees an increased demand for tire replacements indicated by the greater number of cars on the road and the increasing consumption of gasoline. Both are agreed, however, that sales of original tire units will be substantially increased over last year.

The year of 1935 has already upset the previously annual routine in production and sales. Faced with an impending mass strike in the early months tire manufacturers maintained a production rate seldom equalled in the industry's history, with the natural result that tire inventories soared. This immense inventory, unfortunately, was probably in part responsible for the low prices on tires which have existed all year. Now it develops that another precedent is to be upset.

Generally, full tire production does not get well under way until mid-Winter. This year, however, tire production schedules will probably be in full swing by mid-October. This change in pace is due to the fact that new automobile models, which for years have been first displayed in January, will be shown this year in November. Automobile manufacturers, having enjoyed exceptionally good sales all year, are expecting to keep the pace up by stimulating Winter business through the expedient of advancing the date of the annual automobile exposition fully two months.

It follows, therefore, that irrespective of the demand for tire replacements, tire manufacturers will be in full swing in the manufacture of tires for original equipment by mid-October, particularly if numerous new models require a change of tire size, which is usually the case in new automobile models. This activity should extend well into 1935, especially if automobile sales hold up. In any event, despite conflicting statistical reports, the tire manufacturers should be in a healthy position this Fall and Winter.

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Labor Law Test

ONE of the keynotes in the Wagner Labor Law provides for "majority representation." That is, any employees' group which can prove that its membership includes a majority of a company's employes shall have the right to bargain for the entire labor personnel of that company. It was to be expected that a clause of that nature would soon be put to the test after the bill became a law. The law also provides for a National Labor Relations Board consisting of three members created especially for the express purpose of settling labor disputes and guaranteeing the right of collective bargaining.

The first complaint to be made to the Board has been filed by the United Automobile Workers, charging that the Bendix Products Corporation, of South Bend, Indiana, refuses to recognize the collective bargaining clause. The specific point at issue is the claim of the union that it represents all of the 14,000 Bendix labor workers by means of majority support, a point disputed by the corporation. More, the union's complaint asked the board to conduct an election to prove its claim of representing a substantial majority of the workers.

In all probability the Board will hold hearings, and will then order an election. The predecessor board under the defunct N.R.A. followed this routine regularly. This was the case experienced in the rubber industry by Goodrich and Firestone and their respective unions. If Bendix refuses to abide by the Board's final decision, the Board, under the terms of the Wagner Law, has the right to invoke the aid of the courts to compel compliance. Likewise, the corporation which believes itself aggrieved by the Board's decision, may obtain a review of the order in any circuit court of appeals. We predict a long drawn out court battle.

Because of the similarity of the Bendix dispute with that experienced by rubber manufacturers last year, both rubber managements and unions will follow this battle closely. Its eventual decision should have a definite reaction on the relationship of rubber manufacturers and their employes. It is possible, however, that rubber unions will not await the outcome of this industrial dispute but will seek to find their own answers in complaints of their own filing.

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Rubber Shipments

SHIPMENTS of crude rubber from countries involved in the restriction scheme continue to disappoint interested parties. It was reasonable to expect reduced exports beginning with July since the International Rubber Regulation Committee limited all exports to 65% of basic quotas after July 1. However, current figures from Malaya indicate that rubber shipments from that country for the month of August increased approximately 3,000 tons in face of the anticipated decline. Shipments in July were larger than June due to increased exports from Malaya, Ceylon and North Borneo. All in all the results of the restriction program thus far in the third quarter have been extremely disappointing to many. Nevertheless, high hopes are still held for the eventual success of the scheme.

CURRENT • NEWS
of the Rubber Industry

SEPTEMBER, 1935

GOODYEAR OBJECTS TO EXAMINER'S FINDINGS

Files Brief with the Federal Trade Commission Listing Its Exceptions and Admitting Some Discrimination But Refutes the Examiner's Amount

Attorneys for the Goodyear Tire & Rubber Company, Akron, in a brief filed with the Federal Trade Commission at Washington on August 13, took exceptions to the findings of the trial examiner's report which has been turned over to the Commission but which has not as yet been made public. In its brief Goodyear stressed the point that it admits granting a price discrimination to Sears, Roebuck & Company of $7,985,440, or 4.46% on the selling price of tires sold to the mail order house, but strongly refutes the examiner's report of an $18,197,481 discrimination, or approximately 10%.

The Federal Trade Commission is attempting to prove that through price dis crimination Goodyear is cutting competition in the sale of tires and tubes between other manufacturers and between Sears-Roebuck and other competing retail tire dealers, including those selling Goodyear tires, such discrimination being a violation of the Clayton Anti-Trust Law.

Five Objections Cited

Summed up, Goodyear made five assertions in its brief, as follows: that the Federal trade examiner had failed to translate the dollar amount of the discrimination into a percentage of a price; that he had improperly excluded from the expenses of Goodyear's dealer business the net losses of company-owned stores; that he had erroneously made an equal proration between Goodyear dealers and Sears-Roebuck business of Goodyear's expenses in advertising and selling Goodyear brand tires; that he had erroneously charged as an expense of Goodyear's business with Sears-Roebuck in 1931 the consideration of $1,250,000 paid by Goodyear for the 1931 contract, instead of charging this amount as an expense of the Sears-Roebuck business in equal annual installments over the 10-year period of the contract; and that, finally, the quantity of Sears-Roebuck's purchases was responsible for several benefits to Goodyear.

In support of its exceptions the Goodyear brief points out the fact that it spent $35,076,325 in advertising Goodyear brand tires during the 1926-1933 period inclusive, and argues that none of this expense should be charged against the cost of private brand tires manufactured and sold to Sears-Roebuck. The brief further cites the fact that during this period Sears-Roebuck spent $6,243,582 in advertising its own brand of tires, $1,700,000 of this amount being expended for mail order advertising, and the balance being spent in regular retail advertising.

Discussing the expenditures of these monies by both companies involved the Goodyear brief argues that the mail order house derived no substantial benefit from Goodyear's advertising, while Goodyear received no selling advantage from Sears-Roebuck's individual advertising.

In filing its exceptions Goodyear, in the submitted brief, agreed with the trial examiner that the profit and loss method is the proper way to determine the extent of the discrimination, but raised objection to the "particular profit and loss statement incorporated in the report." It is Goodyear's aim to reduce the amount of discrimination to a point where it would be justified under the Clayton Act "by reason of differences in costs of selling and transportation," according to the brief. It seems apparent from the tenor of Goodyear's brief that Trial Examiner John Bennett's report found no specific law violation.

According to published reports, attorneys representing the Federal Trade Commission were expected to file a brief in answer to the Goodyear exceptions by September 1, but at this writing (September 5) no such brief has become public. However, a census of opinion indicates that the Commission attorneys will uphold the trial examiner against Goodyear's contention that the discrimination was only 4.46%.

In any event final oral arguments on the case, which has already been two years in the making, will be heard on September 17, after which the Commission will render its report as to whether Goodyear has violated the anti-trust laws in its contract with Sears, Roebuck & Company.

Later News: E. F. Haycraft and P. B. Morehouse, F.T.C. attorneys, have filed their answer to Goodyear's exceptions charging Goodyear discriminated in its price and that sale of tires to Sears-Roebuck "was not made in good faith to meet competition" as claimed by Goodyear in its brief.

Rubbers and Overshoes

In a recent issue of the *Boot and Shoe Recorder* the prediction is made that retail sales of rubbers and overshoes to men will be much larger during the winter of 1935-36 than they were last season. The reasons for this prediction are stated to be several new features which will tempt male purchasers including: brown rubbers for the man whose ensemble must be perfect; unlined rubbers which are washable inside as well as outside; the introduction of dull finish rubbers and overshoes, some of them resembling moire in their finish; concealed zipper fasteners and one-button (glove clasp) fasteners; and even close approximations of an entire shoe with wing tip, foxing and lacing.

PROSPECTS INDICATE ACTIVE FALL SEASON

Survey by Standard Statistics Co. Reveals Rubber Industry's Fiscal Position—Advancement of Auto Show to Favor Tire Manufacturers This Year

Surveys conducted by statistical organizations in recent weeks indicate an active Fall season ahead for the rubber industry, with tire manufacturers expected to realize one of the busiest end-of-the-year periods experienced in years due, mainly, to the advancement of the introduction of new automobile models to November 2, 1935, instead of the first week in January, 1936.

The fiscal position of the rubber industry is summed up by the Standard Statistics Company, of New York City, as follows: average inventory costs of crude rubber are about 11 cents a pound, some 50% higher than the figure occurring a year ago; hourly wages in the last few months have been approximately 13% higher than a year ago; tire prices, despite price cutting tactics, are some 9% higher than they were last year.

Tire Price Structure Weak

Shipments of tires for all uses in 1934 amounted to 46,785,000. According to the Standard survey the 1935 total should moderately exceed that figure. Replacements of worn out tires, however, are expected to be somewhat below the 1934 total, with the increased purchase of tires as original equipment making up the loss. The survey also states that there seems to be no outspoken dissatisfaction with the present 12 cent price of spot rubber. The weakness of the prevailing tire price structure is said to be due in part to the heavy inventories piled up early in the year by Akron manufacturers in anticipation of the threatened strike.

Contrariwise to the replacement tire sales forecast of the Standard survey, the brokerage house of Jackson & Curtis, New York City, visualizes an increased demand for tire replacements "indicated by the greater number of cars on the road and by the steadily increasing consumption of gasoline." This survey also stresses the point that tire manufacturers will be kept busy this Fall and Winter due to the early holding of the annual automobile show.

Discussing the possibility of a general rise in the prices of rubber articles the Jackson & Curtis survey states that if the 65% of permissible quota exports under restriction is maintained for the balance of the year, and if the 1935 world consumption rate is equal to 1933 or 1934 as expected, then higher prices will result "dependent on the extent of the increase in consumption and the corresponding decrease in world stocks."

SUMMON RUBBERWORKERS TO AKRON CONVENTION

An official union call to a convention in Akron on September 12 for the purpose of organizing an international union of rubberworkers was issued in mid-August to some 55 to 60 federal unions in the rubber industry by Coleman C. Claherty, American Federation of Labor organizer for the rubber trade. It is believed the session will last a full week.

The convention marks one of the first steps in the program of the American Federation of Labor to band together the semi-skilled workers of mass industries into autonomous international unions, the real purpose behind the intensive membership drive started two years ago in the rubber industry. In the past only federal labor unions, each affiliated directly with the A. F. of L. have been organized, such as the Goodyear local, the Firestone local, etc.

Each federal rubber union is permitted to send one delegate for each 100 members represented, based on the per capita tax paid to the parent organization in July. Delegates to attend the session from several Akron unions have been elected. The Akron delegates are expected to play a leading role in the convention since they will represent unions in factories having the largest number of members. John House, president of the Goodyear local, has been mentioned as a possible president for the new international union to be formed.

Sentiment among the rubber unions stresses the formation of an international union along industrial lines, i.e., to make eligible for membership all types of employes in rubber factories irrespective of their crafts. This point will probably be the chief topic at the Akron convention, which will be held at the Portage Hotel. William Green, president of the American Federation of Labor, under whose direction the official call for the convention was issued, was expected to be in Akron for the daily sessions.

NEW YORK RUBBER GROUP WILL MEET OCTOBER 11

The New York Rubber Group will hold its next meeting on Friday evening, October 11, in the clubrooms of the Building Trades Employers Association, at 2 Park Avenue, in New York City. The usual dinner will precede the meeting. No speakers have yet been selected for the evening.

An invitation has been extended to the Society of Rheology, which will hold a two-day meeting on October 11 and 12 in the auditorium of the Bell Telephone Laboratories in New York City, to join the members of the New York Rubber Group at the dinner scheduled for the evening of October 11. Many rubber technologists are members of both organizations.

The two-day session of the Rheology group will feature symposiums on rubber, viscosity and mobility, and plastics. Papers announced for the rubber symposium include the following: A New Simplified Extrusion Plastometer for Unvulcanized Rubber, by J. H. Dillon (Firestone); Absolute Rheology of Raw Rubber, by M. Mooney (U. S. Rubber); Heat Generation in the Flexometer, by R. S. Havenhill (St. Joseph Lead); Hysteresis Loss of Raw Vulcanized and Pigmented Rubber, by C. E. Barnett (N. J. Zinc); and Further Work on the Drift of Rubber Bands under Constant Load, by M. L. Braun of Catawba College, Salisbury, North Carolina.

100° Below Zero!

A thought for hot days is the fact that a temperature of one hundred degrees below zero, the most intense cold yet used on an industrial scale, is involved in the production of DuPrene. This temperature is below anything naturally occurring on earth where the bottom report is 90° below in Siberia. Even stratosphere averages run only between 60 to 70 degrees below. The extremely cold temperature used by Dupont is a factor in separating from acetylene the substance which is the base of DuPrene.

CHICAGO RUBBER GROUP TO HOLD JOINT SESSION

Arrangements have been concluded between the Chicago Rubber Group and the Chicago Section of the American Chemical Society to hold a joint meeting of the two groups this Fall. The joint session will be held on Friday evening, October 25, in the Stevens Hotel, Chicago. Dinner will be served at 6:15, according to present plans, in a private dining room. At about 8 o'clock a talk will be heard, after which the regular group meetings of the Chicago Sections will be held.

The paper of the evening will be presented by Dr. Norman A. Shepard, director of chemical research for the Firestone Tire & Rubber Company. Although Dr. Shepard, who has appeared before divisional meetings several times, has not yet named the subject of his talk it is known that it will be devoted to one of general interest to rubber chemists. Due to the joint meeting the program committee is making arrangements to take care of some 600 persons, expecting one of the largest meetings held in Chicago by the American Chemical Society's divisions in some time.

R. I. Club Sets Meeting Date

The next meeting of the Rhode Island Rubber Club will be held on September 19, at the Metacomet Golf Club, in East Providence, R. I. Although no featured speaker has yet been selected, Mr. F. E. Rupert, secretary, states that there will be plenty of golf in the afternoon, and a steak dinner served at 7:00 P. M.

Later News: The speaker for the meeting will be A. E. Benson, head of the Tire Construction Division of the Product Development Department, Fisk Rubber Company. Mr. Benson will discuss "Pneumatic Tires."

Demonstrate Direction Compass

To more fully acquaint the general public with the increased safety of air travel, the General Tire & Rubber Company and the Columbia Broadcasting Company, were scheduled to demonstrate the operation of the radio direction compass, on September 7. Ray W. Brown, pilot of the General-owned "Miss Streamline" plane, was to swing around a huge circle covering ten eastern cities in all, broadcasting from the plane and telling how he is being guided from city to city entirely by radio broadcasts from various key stations. The demonstration was arranged by executives of the Columbia net-work and William O'Neil, president of General Tire.

REVEAL FINAL DETAILS OF DAYTON ACQUISITION

Final and complete details regarding the acquisition of the McClaren Rubber Company, of Charlotte, North Carolina, by the Dayton Rubber Manufacturing Company, Dayton, Ohio, have been revealed. Announcement of the acquisition was made in the previous issue. The McClaren factory will be continued in operation until mid-September, after which date all of the molds and machinery used in the manufacture of McClaren tires will be transferred to the Dayton headquarters and the Charlotte factory closed. The McClaren molding equipment is valued at approximately $75,000, according to report. Dayton Rubber's acquisition of McClaren did not include purchase of the company's buildings or land.

The Southern factory, which was permitted to operate until mid-September for the sole purpose of disposing of an estimated $250,000 inventory, was established in 1919, and up until its dismantling was the largest tire manufacturing plant below the Mason and Dixon line. It manufactured a complete line of tires under the McClaren trade name of a standard reported to be equal to tires produced by Dayton Rubber. McClaren's annual business is said to have grossed between $2,000,000 and $2,500,000 for the last two years.

After removal of the McClaren tire manufacturing equipment to Dayton, McClaren tires will be manufactured in a separate division. Irving Eisbrouch, former McClaren president, will be in charge of their distribution. The McClaren distributing organizations are being retained, these being scattered throughout the country. Four other McClaren members will transfer their activities to Dayton, these being Harry E. Williams, who will act as sales manager for the McClaren Division; Charles G. Miller, chemical engineer; P. J. Mayle, treasurer; and A. G. Heller, production manager.

MEXICO IS PRODUCING MAJORITY OF ITS TIRES

Although exports of automobile casings to Mexico from the United States numbered 11,987 in the first four months of 1935, an increase of 20% over the 9,987 exported in the same period of 1934, the country is producing a large portion of its domestic tire requirements. Total exports of tires to Mexico in the first four months of the current year by principal manufacturing countries amounted to 15,579, of which 507 came from Canada, 20 from France, and 3,065 from the United Kingdom.

It is believed, however, that a large part of these shipments were tires of the larger sizes for trucks and buses which are not as yet being produced in large quantities in Mexico.

The apparent influence of the Mexican tire manufacturing industry upon exports of tires to that country may be seen by a comparison of statistics for 1929 and 1934. In 1929 tire exports to Mexico numbered 185,959 automobile casings, of which 86 per cent originated in the United States, while in 1934 the total was 34,560, of which 78 per cent originated in the United States.

Mexican imports of crude rubber reflect this increased tire manufacturing activity, for in 1933 they amounted to 2,006,733 kilos and in 1934 to 2,844,106 kilos. This shows that Mexico is rapidly changing from a country importing large quantities of pneumatic tires to one which produces the bulk of its own requirements.

FEW RUBBER DIVISIONS SHOW ANY IMPROVEMENT

Upsetting predictions made earlier in the year, few divisions of the rubber industry show improvements during the first half of 1935 over the preceding year, according to an industrial survey by Dun & Bradstreet, Inc. Slight gains were recorded in January and February but in the months that followed neither output nor sales succeeded in reaching the 1934 comparatives, according to the report.

Restricted tire distribution resulted in heavy additions to inventories, which unsettled the price structure and, instead of making a planned mark-up of 20 per cent in quotations, which was needed to insure profitable operations, manufacturers were forced to extend further concessions to dealers. While one of the leading tire makers (Goodrich) reported larger profits as well as a 9.95 per cent sales increase for the first six months over last year's, another (Goodyear) had a sales gain of 11.32 per cent, but profits were under the 1934 figures.

With the exception of the mechanical goods division, for which an increase of 5 to 10 per cent was reported over the 1934 showing for the comparative six months, output of rubber goods was not on a par with last year's level, according to the survey. Minor gains were recorded for the production of golf balls, rubberized bathing suits, and garden hose, and there was a broader demand for rubberized thread. Manufacturers of rubber sundries, hospital and surgical supplies showed but slight variance from their schedules of a year ago.

In the manufacture of automobile tires, production each month this year, with the exception of January and February, was below the corresponding 1934 totals. This reduced output for the six months to 25,951,456 tires, a decline of 1,053,717, or 3.9 per cent from the 27,005,173 units turned out in the first half of 1934.

Inventories of tires, which had been reduced to 9,455,000 units at the close of December, 1934, increased to 10,398,000 on January 31, 1935. This rise was extended through February and March, and there was no decrease of consequence until June 30, when tires in the hands of manufacturers dropped to 10,755,400 units, a decrease of 3.4 per cent from May, but a gain of 5.2 per cent over 1934.

During the first half of the current year, consumption of crude rubber by manufacturers in the United States was smaller for four of the six months than in 1934. The year started auspiciously, with January consumption of 47,103 long tons representing a rise of 28.5 per cent from December and a gain of 19.9 per cent over January, 1934. In February, the figure dropped to 43,187 long tons, a loss of 8.3 per cent from January, but above 1934 by 6.3 per cent.

For each month that followed a decline was registered from the 1934 comparatives, which ranged from 0.3 per cent for April to a high of 9.5 per cent for March. The gains in January and February, however, were sufficiently large to carry consumption for the six months to 255,815 long tons, which exceeded the 1934 total of 254,908 long tons by 0.4 per cent, according to statistics compiled by The Rubber Manufacturers' Association, Inc.

This small gain may cause a downward revision of the estimate of 1935 consumption, which was placed at 500,000 long tons at the beginning of the year. In 1934 the total was 454,350 long tons, which was larger by 13.7 per cent than in 1933, and surpassed all records back to 1929, when consumption established a peak of 469,804.

Higher operations in industrial plants have broadened demand for mechanical rubber goods, such as belting, hose, packing, washers, and insulating materials, sales in this division averaging 10 to 15 per cent larger than during the comparative six months of 1934. The long rainy Spring lifted sales of raincoats and rubber footwear 15 to 25 per cent above last year's level.

While the rise in new equipment sales of tires paralleled closely that of automobile production, tire shipments for the first six months of this year totalled 24,627,484, or less by 1,101,114 units than in 1934. This was attributed to a decline of nearly 3,000,000 in replacement sales, due to the widening popularity of retreaded tires, as between two and five million tires were retreaded during this period.

The 5 manufacturers of rubber goods declared bankrupt in 1934 represented the fewest number for any year since 1930, and the involved indebtedness of $62,551 was the smallest on record. This favorable showing, however, has not been continued in 1935, as for the seven months of this year 3 failures were listed with liabilities of $159,056, or more than double those for the full year of 1934 and above the 1933 total.

DIVERSITY AND NEWNESS FEATURE CHEMICAL SHOW

Principal keynotes of the 15th Exposition of Chemical Industry, which is to be held during the week of December 2-7, at the Grand Central Palace, in New York City, will be diversity and newness, according to the exposition directors. They define diversity as the result of new emergence by every branch of the chemical and related industries in the recovery period, and newness as being the summation of the research and development results which have been carried forward during the past five years.

Attracting larger attendances each year it is held, the 1935 exposition is being planned to induce still larger crowds. It will cover not only the field of raw materials and production machinery, but the interests of successful marketing will have sections devoted to materials handling, packaging, bottling, labeling, and on up to the final marketing of chemical industrial products of all types. A group of exhibits will pertain particularly to the brewing and distilled spirits industry. A feature of the exposition will be the awarding of a bronze plaque, suitably engraved to the company most contributing to the meritorious advances of the industry, by *Chemical and Metallurgical Engineering*. A similar plaque was won by the Carbide and Carbon Chemicals Corporation at the last exposition.

The 15th Exposition of Chemical Industries is under the personal direction of Charles F. Roth, manager, International Exposition Company, with headquarters in the Grand Central Palace. Mr. Roth has directed the expositions since their inception in 1915.

Wishnick-Tumpeer Moves

Wishnick-Tumpeer, Inc., has moved its executive offices from lower Manhattan to 295 Madison Avenue in New York City, where it occupies the entire fortieth floor. The building adjoins the Chemists' Club. The removal to larger and more convenient quarters is coincident with the 15th anniversary of the company's founding and is said to be the result of increased business activity in the chemical consuming industries.

COMPLETE DETAILS OF KELLY REORGANIZATION

Details regarding the reorganization of the Kelly-Springfield Tire Company, whereby the Goodyear Tire & Rubber Company acquired control through an exchange of cash and Goodyear stock for Kelly-Springfield stocks and notes, are rapidly being completed. It has been definitely decided that Kelly-Springfield will be operated as a wholly owned, but wholly independent, subsidiary of Goodyear.

EDMUND S. BURKE

Edmund S. Burke, who first joined Kelly-Springfield early last year as assistant general manager, was elected president in July of the same year upon the resignation of W. H. Lalley, and who acted as one of the trustees during the company's financial difficulties, has again been appointed president. In his first statement upon resuming the presidency, Mr. Burke made it clear that Kelly-Springfield would continue to produce a complete line of passenger car, truck and bus tires and tubes, in addition to the accessories and repair materials previously produced.

This statement caused some surprise in the industry, since it was believed that Goodyear offered to reorganize the company with cash and exchange of stock for the purpose of acquiring the Cumberland (Maryland) factory for its own uses. It was further believed that the Kelly-Springfield tire line would be discontinued and the factory devoted to the manufacture of other lines of merchandise. However, it is apparent that Kelly-Springfield will continue to operate precisely as it did in the past forty-one years of its existence.

All of the assets of the old Kelly-Springfield Tire Company have been transferred to the new company, except a claim for refund of United States income and excess profits taxes, in exchange for cash and Goodyear common stock. A fund has been set aside to meet the claims of general creditors and other expenses approved by the United States District Court of Maryland which confirmed the Goodyear plan of reorganization on August 5. Holders of 10 year 6% subordinate notes are to surrender their notes to the Public National Bank and Trust Company, 76 William Street, New York City, while holders of certificates for $6.00 preference stock or common stock are to surrender them to the New York Trust Company, 100 Broadway, New York City.

Names in the News

TOM MASON, president, Rubber Novelties, Ltd., Manchester, England, has been visiting the Pioneer Rubber Company factory at Willard, Ohio. Mr. MASON'S concern handles the sale of Pioneer products in England.

LOUIS J. DEHOLCZER resigned his position with Jenkins Bros., Bridgeport, Conn., and became associated with the Accurate Manufacturing Company, Garfield, N. J., as factory manager as of August 1.

WILLIAM M. HUNTER, associated with the New York Belting & Packing Company for the past ten years, has resigned from that company, and has been appointed to a sales position with the Boston branch of U. S. Rubber Products, Inc., in the Mechanical Goods Division.

H. E. BLYTHE, vice-president, Goodyear Tire & Rubber Company, was awarded a 20-year service pin last month. He joined Goodyear on July 1, 1915, and acted as factory manager for California Goodyear for many years. At present he is assistant to President Litchfield, in addition to his other duties.

RALPH W. GRANT has been appointed Eastern sales representative for the National Rubber Machinery Company, of Akron, to replace HARRY J. SMITH who recently resigned to form his own sales agency as reported elsewhere in this issue. OTTO J. KUHLKE has been placed in charge of the Western district operating out of the Akron headquarters.

ALLYN K. THAYER, Akron representative for C. K. Williams & Company, was named president of the Portage Camera Club last month succeeding Joseph Brady. The club meets at the Akron Y. M. C. A.

H. C. ACKEN has been appointed district manager of the Omaha (Nebraska) branch of the United States Rubber Company's tire division. He was formerly located in Chicago.

MARTIN H. KIDDER has been named director of advertising and industrial relations of the American Foundry Equipment Company, Mishawaka, Indiana. He was formerly associated with the Link-Belt Company, and prior to that with the Boston Gear Works.

JOHN A. SCHAEFFER, vice-president and director of research, Eagle-Picher Lead Company, assumed the post of president of Franklin and Marshall College, Franklin, Pennsylvania, last month. He was associated with Eagle-Picher for 24 years.

MISS VERNA MAE GREER, cashier of the Firestone Tire & Rubber Company, Akron, since 1908, was listed as one of America's 16 most representative business women, in the September issue of *Fortune*.

GODFREY L. CABOT, head of Godfrey L. Cabot, Inc., of Boston, has endowed Norwich University, Northfield, Vermont, with a substantial gift to found a professorship in air traffic, regulation, and transportation, the chair to be named in honor of his eldest son, JAMES JACKSON CABOT, who died five years ago. Mr. Cabot is a trustee of the university.

PHILIP J. KELLY, formerly associated with Goodrich as advertising manager, and more recently connected with the Meldrum & Fewsmith advertising agency, has joined Harry Latz Service, Inc., of New York City, as executive vice-president.

PAUL VAN CLEEF, executive of Van Cleef Bros., Chicago, is now in Europe contacting foreign representatives of that company. He is expected to return to the United States about October 17.

PORTER D. COLLINS, formerly branch manager for Goodyear in Michigan and California, has been appointed advertising manager of the Kelly-Springfield Tire Company, Cumberland, Maryland. Goodyear recently absorbed Kelly-Springfield but is operating it as an independent corporation.

JOSEPH BRECKLEY has joined the technical sales department of the Titanium Pigment Company, New York. He was formerly associated with the Dovan Chemical Company and prior to that was in the employ of the Seamless Rubber Company.

HARRY KLEINERT, factory manager of the I. B. Kleinert Rubber Company, College Point, L. I., N. Y., sailed for Europe last month on a combined business and pleasure trip, accompanied by Mrs. Kleinert. He will return about October 1.

ED SHEAHAN, general superintendent of the Goodyear Tire & Rubber Company factory at Sydney, Australia, arrived in the United States last month, and will attend the Goodyear Interplant Conference in Akron which opens September 25th.

F. B. JEWETT, vice-president, American Telephone & Telegraph Company, and head of the research staff of the Bell Telephone Laboratories, addressed a group of Goodrich employes in Akron recently. He spoke on "Research."

W. J. LATTIMORE has resigned his position with the research staff of C. K. Williams & Company, Easton, Pennsylvania. He is expected to announce a new connection with a New York company shortly.

RAY W. BROWN, aeronautical sales manager, General Tire & Rubber Company, Akron, was one of the honorary pall bearers for the unfortunate Wiley Post, killed in the tragic air crash in Alaska along with the inimitable Will Rogers.

S. F. POPPE and R. F. HOLDEN, both of whom have been actively associated with the Poppe Rubber & Tyre Company, Middlesex, England, have been taken into partnership.

F. B. DAVIS, chairman of the board, U. S. Rubber Company, New York, was appointed one of the original trustees of the American Wild Life Institute, formed last month by leading sportsmen to protect wild life and restore its natural habitat wherever possible.

H. C. BUGBEE, of the purchasing department of the B. F. Goodrich Company, Akron, was scheduled to sail for Singapore on September 7 from San Francisco where he will assume new duties in the crude rubber purchasing division.

HERBERT W. MAXSON, manager of public relations, B. F. Goodrich Company, Akron, was a field judge and a member of the advisory committee, at the recent air races held in Cleveland.

J. L. EARL, who had been in charge of tire sales to oil firm distributors for the Mohawk Rubber Company, Akron, has been named vice-president and general manager of that company. He was formerly associated with the Goodyear and Lee companies.

HENRY J. KEHE has joined the chemistry and chemical engineering staff of the B. F. Goodrich Company, Akron.

ERIC N. BLACKSTEAD, formerly in charge of laboratory sales for the Ansbacher Siegle Corporation, is now acting as New England technical adviser for the company.

C. T. HUTCHINS, advertising director of the Goodyear Tire & Rubber Company, Akron, for the past seven years, has resigned that post and joined the executive staff of the J. Walter Thompson Company, advertising agency. He will maintain headquarters in the New York office.

Hauser Returning to U. S.

Dr. Ernst A. Hauser, internationally known rubber technologist, and chief chemist of the Semperit Austro-American Rubber Works, Ltd., of Vienna, since 1933, is returning to the United States. Dr. Hauser has been appointed Associate Professor of Chemical Engineering at the Massachusetts Institute of Technology, Cambridge, Mass., and will assume his new duties this Fall. He has also been retained by the R. T. Vanderbilt Company and the Dewey & Almy Chemical Company and will work closely with their respective laboratories.

Graduated from the University of Vienna in 1921, with a Ph. D. degree, Dr. Hauser served as assistant to Professor Max Born at Gottingen, Germany, for a year, became first research chemist for the Krause Dried Products Company in 1922, chief chemist of the Colloid-Chemical Laboratory of Metallgesellschaft A.G. in 1925, and later joined the Semperit Works. Due to his research activities the first commercial process for concentrating latex was developed. He has also pioneered many of the present extensive uses of latex including those associated with soles on shoes and rubber-impregnated fabrics. He is a member of many international rubber and chemical associations and has written several books treating with rubber technology. Recently Dr. Hauser completed a round-the-world tour.

Smith Sails to Europe

Harry J. Smith, of the recently-organized Continental Machinery Company, Inc., New York City, sailed last week on the Aquitania, accompanied by Mrs. Smith. He will spend several months covering all of Europe wherever rubber companies are located, consulting on a number of large projects Continental Machinery is working on.

Handling I.R.I Transactions

The Engineers Book Shop, 168 East 46th Street, New York City, advises that it has made arrangements with the Secretary of the Institution of the Rubber Industry, London, for several copies of the bimonthly publication issued by it, i.e., I. R. I. Transactions, for distribution in the United States.

ADVERTISING PAGES REMOVED

Financial News

GOODRICH 6-MONTH NET INCREASED OVER 1934

Net profit of the B. F. Goodrich Company, and subsidiaries, for the six months ended June 30, 1935, amounted to $1,553,040, after the deduction of all charges, which compares with $1,486,956 reported as net profit for the corresponding 1934 period. Current net profit is equal to 45 cents a share on 1,156,101 common shares outstanding, after preferred dividends, which compares with 40 cents a share on the common stock in the preceding year's period.

Gross sales for the 1935 period were reported at $59,161,319 as compared with $52,363,157 for the corresponding 1934 period. Net profits from operations were reported at $2,902,977 before adding profits from the sale of Goodrich securities and the purchase of Goodrich bonds, amounting to $222,769, and before deducting interest charges of $1,272,706 and $300,000 provision for Federal income taxes.

The consolidated balance sheet as of June 30, including the Hood Rubber Company balance sheet (Hood Rubber became a Goodrich subsidiary again on June 13) shows current assets of $72,970,375 against current liabilities of $17,412,030, a ratio of 4.19 to 1. The balance sheet shows a surplus of $107,535 contrasted with a deficit of $2,122,364 in the profit-and-loss account on December 31, 1934. The improvement was due to the net earnings and a direct credit of $676,859 representing the excess of the net worth of Hood Rubber on June 30 over the book value of Goodrich's investment in Hood Rubber. Goodrich bank loans were reported as being $5,375,000 on June 30.

UNITED CARBON PROFIT INCREASED OVER 1934

Operations of the United Carbon Company, and subsidiaries, for the first half of 1935, resulted in a net profit of $937,969 after deducting all charges, which is equivalent to $2.36 a share on 397,885 no-par shares of common stock outstanding. This profit compares with $670,373, equivalent to $1.67 a share on 370,127 common shares outstanding, in the first six months of the previous year.

For the second quarter of 1935 United Carbon showed a net profit of $460,336, after deducting all charges, which compares with a $477,633 profit reported in the first quarter. The 1935 April-June profit amounted to $1.16 a share on 397,885 common shares as compared with $1.21 a share on 394,327 common shares in the first quarter and 90 cents a share on 370,127 common shares, after preferred dividend payments, in the second quarter of 1934.

U. S. Rubber Nets $658,580

As indicated by its preliminary statement, details of which appeared in our previous issue, the United States Rubber Company showed a net profit of $658,580 for the six months ended June 30, 1935, after depreciation and other charges. Total net sales for the period amounted to $57,722,837 as compared with sales of $52,495,958 in the first six months of the previous year. Total current assets are reported at $60,275,290 against total current liabilities of $19,048,100. U. S. Rubber's plantations had a profit of approximately $215,000 after all charges, these earnings not being included in the results of the U. S. Rubber Company reported above. The company's statement shows tax charges during the first six months of 1935 amounting to approximately $4,340,000.

Intercontinental Has Loss

Intercontinental Rubber Company, and subsidiaries, report a loss of $60,856, after depreciation, for the first six months of 1935, which compares with a deficit of $39,891 reported for the corresponding 1934 period. Depreciation amounted to $40,599 against $65,899 in the first half of last year. In a report to stockholders President George H. Carnahan stated that for 1935 the company's Sumatra plantation has been given an increase in recognized standard production to 2,179,352 pounds, but will be permitted to export only 60% of that amount according to present indications.

Columbian Carbon Net Rises

Columbian Carbon Company, and subsidiaries, in a preliminary statement, reports net profit of $1,502,492 for the first six months of the current year after deducting taxes, depreciation, depletion, and minority interests, equal to $2.79 a share on 537,681 no-par shares of common stock. This compares with a net profit of $1,185,529, or $2.20 a share on 538,420 shares of common stock, in the first half of 1934. Based on a comparison of Columbian Carbon's profits for the first quarter of the fiscal year and the six month's period, profit for the second quarter of the year was set at $715,034 after charges and taxes, equal to $1.22 a share on 537,681 shares of common stock.

Thermoid Co. Earns $146,878

After deducting all expenses, including interest of $73,073 on its 6% notes and an allowance of $65,439 for depreciation, the Thermoid Company, and its wholly owned subsidiaries, report a net operating profit of $146,878 for the first six months of 1935, as compared with a net profit of $93,446 for the same period of 1934. The 1935 six-month profit does not include provision for income taxes.

Jenkins Earnings Drop

Jenkins Bros., Inc. report a net income after depreciation, taxes, and other charges, but before Federal Income Tax, of $86,272 for the six months ended June 30, 1935. This is equal to 51 cents a share on 125,824 common shares, after 7% preferred dividends. The current reported profit compares with a profit of $110,259, or 71 cents a share on 125,744 common shares in the first six months of 1934.

Raybestos-Manhattan Profit

For the first six months of 1935 Raybestos-Manhattan, Inc. reports a net profit of $752,360 after depreciation, Federal taxes, and other charges, equal to $1.17 a share on 638,600 no-par capital shares, excluding 37,412 treasury shares, which compares with $719,832, or $1.12 a share on 642,900 in the 1934 period.

GOODYEAR'S EARNINGS SLIGHTLY UNDER 1934

In the first six months of 1935 the Goodyear Tire & Rubber Company, and subsidiaries, earned a net profit of $2,404,778, after depreciation, interest, Federal taxes, subsidiary dividends, and other charges, which was slightly under the net profit of $2,617,197 reported for the first half of the preceding year.

Current net profit is equal to $3.19 a share on 752,854 no-par shares of $7 cumulative first preferred stock, as compared with $3.44 a share on 759,720 shares of the same stock in 1934. Despite the loss in net profit earned, Goodyear's total sales in the reported period were 11% higher than in the corresponding 1934 period.

A premium amounting to $606,492 on the recapitalization of the Goodyear Tire & Rubber Company of Canada was charged to surplus in the six months ended on June 30, 1935. Goodyear retired considerable 7% preferred stock on its Canadian subsidiary and concurrently issued and sold $6,000,000 of 5% accumulative preferred stock, the transaction resulting in a reduction of preferred stock charges prior to common stock dividends, according to the current report.

President Litchfield, in making the six-month report public, stated that the loss in profit, despite increased sales, was due to the disastrous price wars experienced in the first few months of the current year. He also announced the regular quarterly preferred dividend of $1 per share payable on October 1 to stockholders of record on September 1.

N. J. Zinc Reports Profit

For the quarter ended June 30, 1935, the New Jersey Zinc Company reports net income of $1,113,324, after deducting taxes, depreciation, contingencies, and other charges, equivalent to 57 cents a share on 1,963,264 shares of $25 par value stocks. In the preceding quarter the profit was reported at $1,060,889, or 54 cents a share. In the June quarter of 1934 profit amounted to $994,304, or 51 cents a share. For the six months ending June 30, 1935, net income was $2,174,213, after taxes and other charges, compared with $2,086,511 in the first half of 1934.

International Trade Declines

Estimates of international tire trade in exports by principal manufacturing companies, revealed by the Department of Commerce, show a decline of 19% in the first six months of 1935 as compared with the same period of 1934, and a 14% decline compared with the first six months of 1933, the figures for the three years being 2,199,000, 2,712,000 and 2,567,000 casings, respectively. Only two countries exported more tires than in 1934, these being Germany and Japan. Exports from the United States show a 23% loss, while exports from the United Kingdom show a 14% loss.

Wilson Factory Re-opened

Coincident with the settling of its employee difficulties, the factory of the Wilson Rubber Company, Canton, Ohio, was reopened late last month. Since its employes walked out on strike several months ago pickets have surrounded the Wilson factory and were not withdrawn until the employes voted against representatives of the American Federation of Labor representing them with the management. Shortly after this vote was taken the employes returned to work.

Obituaries

Henry P. Rand

Henry P. Rand, founder of the Rand Rubber Company of Brooklyn, New York, died as the result of burns received on September 4th, when fire destroyed his summer home at Stony Creek, near Branford, Connecticut. The body of Mr. Rand

was recovered an hour and a half after fire of undetermined origin broke out. His wife and a maid, also in the house when the fire started, escaped unharmed, although a neighbor trying to fight his way upstairs to answer Mr. Rand's cry for aid, was severely burned and broke a leg when fire forced him to fall down a flight of stairs. Mr. Rand was born in New York City 81 years ago, and received his education at the local public schools. Fifty-five years ago he founded the Rand Rubber Company in Brooklyn, remaining as its president until his retirement several years ago when he was succeeded by his son, Leroy H. Rand, who still occupies the presidency. After his retirement, the elder Mr. Rand acted in an advisory capacity. His official residence was at 346 New York Avenue, in Brooklyn, but he maintained the summer home at Stony Creek and a winter home in Florida. Funeral services were held on September 6th at the New York and Brooklyn Funeral Parlor, in Brooklyn, with interment in Mount Neboh Cemetery, Glendale, Long Island, New York. Surviving Mr. Rand are his widow, his son LeRoy, and two daughters.

Franklin L. Meyer

Franklin L. Meyer, rubber chemist, and former instructor of electricity at the Trenton School of Industrial Art, died August 23 at Custer, South Dakota, after an illness of several years. He was 60 years old. Mr. Meyer was rubber chemist for the John A. Roebling's Sons Company, Trenton, N. J., for 33 years and also head of the insulating laboratory during that time. He resigned the position four years ago to accept the art school position. Last May he suffered a stroke and went west. He was a native of Sutton, Nebraska, and came to Trenton in 1898 after being graduated as an electrical engineer from the University of Nebraska. The Roebling Company had been having its wire insulated at the plant of the Murray Rubber Company and later established its own plant for that work. Thirty years ago few colleges had courses in rubber chemistry and Mr. Meyer had to instruct his own assistants. Mr. Meyer was a member of the Hamilton Avenue M. E. Church and Sunday School, Trenton. He is survived by his wife and daughter.

Merwin J. Goldner

Merwin J. Goldner, secretary, and one of the founders of the Corduroy Rubber Company, Grand Rapids, Michigan, died on August 1 at his home in Grand Rapids, after an extended illness of two and one-half years, at the age of 45. Born in Grand Rapids he resided in the vicinity of that city during his entire life. Graduated from Central High School in 1910 he soon became associated with the Diamond Rubber Company, later joining the United States Tire Company, becoming office manager of the local branch. Together with L. A. Brown he organized the Corduroy Rubber Company and was its secretary from its inception until his death. An eminent sportsman he was responsible for a state bass rearing pond at the Corduroy factory. For years he maintained a collection of rare breeds of chickens, ducks and geese at his farm home. Mr. Goldner was also a prominent clubman being a member of many social organizations. Funeral services were held on August 3 at his home. He leaves a widow, father, brother and three sisters.

James E. Tranter

James E. Tranter, associated with the auditing department of the Goodyear Tire & Rubber Company for the past 19 years, died on September 3 at St. Thomas Hospital, Akron, at the age of 58. A resident of Akron for the last thirty-five years, Mr. Tranter was a member of Akron Lodge, 83, F. and A. M. Funeral services were held on September 6 at St. Paul's Episcopal Church, with burial in Rose Hill Cemetery. He leaves a son, daughter, and three sisters.

Robert Lindley

Robert Lindley, chief electrician for more than twenty-two years for the Hamilton Rubber Manufacturing Company, Trenton, N. J., died on August 17 at the age of 63 after an illness of several months. He was a member of Trenton Forest, Tall Cedars of Lebanon. Burial took place in Trenton. He leaves a widow, three sons and four daughters.

Footwear Factory at Selangor

Known as the Malayan Rubber Works, a small rubber footwear factory has been started at Klang, Selangor, in Malaya. The company is utilizing machinery purchased from the Tan Kah Kee concern which was recently liquidated. In operation since early June, the Malayan Rubber Works is reported to be turning out approximately 1,000 pairs of rubber shoes daily, and expects to increase this rate soon.

EXPORTED RUBBER GOODS SHOW AN 11% DECLINE

During the month of May exports of rubber products from the United States were valued at $1,745,173, a decrease of approximately 11% below exports shipped in May of 1934, according to the Leather and Rubber Division of the Department of Commerce.

Exports of all classes of rubber footwear increased, however, and other items in which the May volume was especially good included rubber soles, rubber bolting, rubberized auto cloth and water bottles and fountain syringes.

Tire shipments were especially low in all lines, and likewise rubber heels, soling and top lift sheets, toy balloons, erasers, reclaimed rubber and rubber manufactures not specified suffered a lower than average volume of trade, statistics show.

The aggregate value of rubber goods exports for the first five months of the year, totaling $9,360,318, remained well ahead of last year, when the five-month total was $8,839,533.

United States imports of rubber products into the United States during May were valued at $136,554, against $185,812 in May, 1934, but the decline is more apparent than real, being largely the result of lower prices on several lines of goods which are being imported to an increasing extent, it was stated.

Ohio Rubber Expanding

In anticipation of increased business prospects this Fall and Winter, the Ohio Rubber Company, Willoughby, Ohio, is erecting a large three story building to better house its milling and compounding department. Additional moves include the replacing of two small Banburys with one of the larger and newer models. The Ford Motor Company was expected to release its initial order to Ohio Rubber for parts and accessories sometime in September.

Canada Footwear Values Drop

Values fixed for duty purposes on twenty-six different classifications of rubber footwear were revised downward recently by the Minister of National Revenue of Canada. The revision does not affect rubber footwear entitled to entry under the British preference. The revision affects large, medium and small sizes.

Machine Tool Show Open

Said to be the largest industrial exposition ever held in the United States, the 1935 Machine Tool Show opened in the Municipal Auditorium at Cleveland, Ohio, on September 11. Sponsored by the National Machine Tool Builders' Association, the exposition is scheduled to continue for 10 days, closing on the night of September 21. Machine tools of every description are on exhibition.

Raybestos Buys Multibestos

Raybestos-Manhattan, Inc., Passaic, N. J., has purchased the manufacturing equipment, trade-marks and good will of the Multibestos Company, a subsidiary of the Dewey & Almy Chemical Company, Cambridge, Mass. It is understood that the purchase, effected September 4, did not include the replacement inventory of Multibestos. It is further understood that Raybestos-Manhattan will continue to operate Multibestos as a subsidiary.

RESTRICTION

Stating that producers were keenly disappointed in the results of the restriction scheme to date, T. M. D. Lowinger, delegate from the Malaya States to the International Rubber Restriction Committee, which met in Singapore the week of August 12, suggested further quota limitations to reduce annual world stocks by 200,000 long tons. According to the Malayan delegate a reduction of stocks in this amount, as of July 1, 1935, could be accomplished without imposing too high a price on the consumer and would bring increased benefits to the producers. No action has yet been taken on the suggestion.

According to a resume of the restriction scheme by the Leather and Rubber Division of the Department of Commerce, total world stocks at the end of June, 1935, stood at approximately the same figure as when restriction went into effect, although there was a decline of some 33,000 tons from the high of last December. As of June 30, Malayan exports were about 25,000 tons behind the quota, Ceylon was about 3,000 tons and Netherland Indian estates some 17,000 tons. However, Dutch native exports were some 33,000 tons in excess of the quota. Taking into consideration current deficits, and the fact that additional quota reductions are in force for the last half of 1935, actual exports in the last six months are still expected to exceed permissible exports under the quota by about 30,000 tons.

Although stocks afloat and stocks in Singapore and Penang have been somewhat reduced, warehouse stocks in several countries have shown slight increases. This is probably due to the fact that imports of raw rubber have not declined to any extent, although rubber absorption in countries other than the United States was less in the first and second quarters of 1935 than in the same periods of 1934, being slightly higher than absorption in the first and second quarters of 1933.

To date restriction has not materially affected the rate of production on the large rubber estates. During the latter half of 1934 these estates worked under pressure to replace stocks cleared prior to June 1, and continued this pressure to meet the quota allotments in the last half of the year. When stocks in restriction zones were reduced early in the current year production kept pace with such reductions. Now, however, with the further quota reductions in the third quarter, and another coming in the fourth quarter, of the current year, the large estates are beginning to experience the effect of restriction. As E. G. Holt, assistant chief of the Leather and Rubber Division points out, the basic quotas for 1936 are, as a whole, 7% greater than for 1935, and maintenance of the present 65% rate for permissible exports would mean an increase of 7% in the monthly production rate next year.

The Netherlands Indian Government will issue an emergency ordinance in October enforcing the fiscal export duty on estate rubber as from January 1, 1936. Debates on the ordinance are not expected to take place in the session of the People's Council now in meeting. The duty, which will not be levied as long as the market price for standard sheets at Batavia is below 17 cents (Netherland), will amount to half a cent per metric pound up to a price of 18 cents. Between 18 and 20 cents the duty will amount to 1 cent, this amount to be raised by ¼ cent for each cent above 20 cents. At present the price at Batavia is 18⅛ cents, the duty therefore amounting to 1 cent, equalling 5% of the London selling price. (The Netherland cent is equivalent to .68 U. S. cent at current rate of exchange).

The Permanent Rubber Commission set up by the Netherlands Indian Government has begun to handle protests by estate owners on 1935 standard productions. Up until August 8, the last day for filing appeals, the Commission had received approximately 300 protests.

The Agricultural Department of Kelantan, in Malaya, has materially helped small-holders to improve the quality of their rubber, according to the Leather and Rubber Division of the Department of Commerce, by selling them hand-rolling machines at cost price, and also providing proper coagulants at cost. Small holders generally attempt to produce good rubber sheets but usually fail to maintain necessary standards of cleanliness.

Expanding Naphtha Program

Expansion of its naphtha program has been announced by the Valvoline Oil Company, of Cincinnati, Ohio. The company has specialized in the manufacture of automotive and industrial lubricants since its founding in 1868. Valvoline maintains its refinery and sales office in Butler, Pennsylvania, and has been producing industrial naphthas for a number of years.

TRENTON NEWS

Strikers at the plant of the Lambertville Rubber Company, Lambertville, N. J., have returned to work following a settlement. The strike leaders have not been given their old jobs. The plant is now employing 250 hands.

Holland B. Slusser, secretary-treasurer of the Pocono Rubber Company, Trenton, has been spending his vacation in California.

Farrington Rubber Company, of Patrick's Corner, has been incorporated at Trenton, N. J., with 1,000 shares no par, to manufacture rubber products. Manning Patrick, Henry Patrick and Theresa Patrick, all of Patrick's Corner, are the incorporators.

Fire recently destroyed some stock at the plant of the Thermoid Company, Trenton. The blaze was caused by an oven door blowing open, igniting material.

The mechanical division of the Rubber Manufacturers Association held its quarterly meeting at the Trenton Country Club on July 7. Following dinner the members played golf. A. D. Kunze, of New York City, chairman of the group, presided. About 35 were present.

C. Edward Murray, Jr., of Willow Gate Farm, Princeton, has been ill in a Trenton hospital with septic poisoning of the gland which he contracted while fishing at Blooming Grove, Pa. Mr. Murray was formerly president of the Murray Rubber Company, Trenton.

NEW ENGLAND

The internal revenue collector for Massachusetts is restrained from collecting AAA processing taxes from the Fisk Rubber Corp., Chicopee Falls, under the terms of an injunction issued in Federal court at Boston on August 28. Fisk has filed suit challenging the AAA on constitutional grounds, basing the action on the recent decision of the U. S. Circuit Court of Appeals at Boston in the Hoosac Mills case, which held the "three A's" unconstitutional. Judge Elisha H. Brewster issued the injunction.

Fisk filed its petition for an injunction to prevent the government from collecting $105,294.63, the amount of the taxes due in April, May and June.

One of the largest employes' outings in Connecticut industrial history was staged August 24 at Pleasure Beach Park, Bridgeport, by more than 3,000 employes of United States Rubber Products, Inc., Naugatuck, Conn. The large crowd was transported to Bridgeport in buses. Sports events, swimming and dancing were enjoyed by the group. In addition to the big affair on August 24, several company departmental outings were held during the month at various points.

More than 1,500 Russell Mfg. Company employes and their families attended an outing August 17 at Falcon Grounds, Lakeview Park, Middletown, Conn., which was featured by an elaborate sports program and a picnic luncheon. President John De Meo of the Rusco union presided at a short speaking program, introducing President G. M. Williams and Secretary Amor P. Smith of the company, as well as several state labor union officials.

Bata Active in Germany

According to information received by the Rubber and Leather Division of the Department of Commerce, the Czechoslovak shoe manufacturing firm of "Bata" is notably active in Germany. The Bata concern has operated a branch factory in that country for several years. The German branch produces a complete line of leather and rubber footwear, practically the complete production being retailed through Bata-owned stores. On July 30 of this year the German branch employed some 17,000 workers, with wages reported to be favorable in comparison with rates prevailing in other German shoe factories.

General Seeks Coast Factory

General Tire & Rubber Company, Akron, is understood to be seeking a factory site on the west coast, preferably near Los Angeles, to establish a branch factory to service western states. President William O'Neill spent several days in Los Angeles last month surveying various plans. A decision as to the new factory site is expected momentarily.

Tire Association Moving

To facilitate the work of George J. Burger, newly-elected secretary and general manager, the headquarters of the National Tire Dealers Association are being moved from Chicago to 143 West 53rd Street, New York City.

JULY CONSUMPTION WAS 1% BELOW JUNE

Consumption of crude rubber by manufacturers in the United States for the month of July amounted to 36,384 long tons, which compares with 36,623 long tons for June, 1935. July consumption shows a decrease of less than 1% below June but was 11.8% above July, 1934, according to statistics released by the Rubber Manufacturers Association. Consumption for July, 1934 was reported to be 32,553 (revised) long tons.

Imports of crude rubber for July were reported to be 46,880 long tons, an increase of 22.3% above the June figure of 38,340 long tons, and 12.9% over 41,530 long tons imported in July, 1934.

Total domestic stocks of crude rubber on hand July 31st are estimated at 330,528 long tons, which compares with June 30th stocks of 320,470 long tons and 365,072 long tons on hand July 31, 1934.

The participants in the statistical compilation report 49,018 long tons of crude rubber afloat for the United States ports on July 31st, compared with 55,581 long tons afloat on June 30th and 45,869 long tons afloat on July 31, 1934.

July reclaimed rubber consumption is estimated at 8,396 long tons; production, 8,421 long tons; and stocks on hand, July 31, 1935, 17,810 long tons.

Form Continental Machinery

Harry J. Smith and Guy L. Hammond, both well-known figures in the rubber machinery world, have formed the Continental Machinery Company, Inc., with headquarters at 277 Broadway, in New York City, to handle various types of rubber machinery, and specializing in the production and sale of latex equipment.

Mr. Hammond, president of the Black Rock Manufacturing Company, Bridgeport, Connecticut, has been engaged in the manufacture and sale of rubber machinery, particularly cutting machines, for many years. Mr. Smith has been identified with the rubber industry at home and abroad for over 30 years. For the last 9 years he has been associated with the National Rubber Machinery Company, of Akron, in charge of all exports and also acting as manager of Eastern (U. S.) sales. Prior to that time he was engaged in the manufacture of rubber goods. Mr. Smith has also supervised the installation of a number of foreign and domestic rubber factories.

Continental Machinery will maintain a staff of sales and technical engineers to assist clients in solving their machinery problems in all parts of the world. The services of a prominent chemical engineer have already been secured to develop machinery and processes exclusively for the new company incidental to the handling of latex. Although the company only recently began operations, it reports numerous inquiries and orders.

The latest step in the planned expansion of the concern is the formation of the Continental Machinery Company, Ltd., with offices in Toronto, Canada.

JAPANESE EXPORTS SHOW 8% INCREASE OVER 1934

Japanese exports of rubber products in the first six months of 1935 were valued at 24,370,611 yen, according to the Department of Commerce, which was 8% greater than in the same period of the previous year and 9% less than for the 1933 period.

Exports of rubber boots and shoes comprise 53% of the total exports of rubber goods, these exports registering a trade gain of 8% over the 1934 six-month period. Other increases occurred in rubber tires and tubes, 13%, and in other rubber products such as mechanical goods and specialties, 85%.

Exports of rubber toys from Japan showed a decline from 4,431,144 yen in 1933 to 3,807,971 yen in 1934, and to 2,076,883 yen in 1935, the figures being for the first six-month periods of the respective years. It is believed that lower unit values to meet growing world competition in the rubber toy trade were partly responsible for the lower total value of Japanese exports.

Callahan Joins Wishnick

Thomas F. Callahan has joined Wishnick-Tumpeer, Inc., making his headquarters at the New York office at 295 Madison Avenue. Mr. Callahan was graduated from Catholic University in Washington, D. C., with a degree of Bachelor of Engineering in 1932. His first employment was with the Palmer Gas Products Corporation where he served under Dr. H. A. Winkelman. He remained with Palmer as head chemist in charge of field operations at Borger, Texas, until May of this year. Mr. Callahan is credited with the development of a microscopic technique for the examination of carbon black dispersions. He has also made extensive studies in the pyrolysis of gaseous hydrocarbons and in the application of finely divided solids in plastic and liquid vehicles.

JUNE TIRE SHIPMENTS WERE 4.8% ABOVE MAY

Shipments of pneumatic casings for the month of June, 1935 amounted to 4,262,360 casings, an increase of 4.8% above May, and were approximately 18.5% under shipments made in June a year ago, according to statistics released by the Rubber Manufacturers Association, Inc.

Production of pneumatic casings for June was reported to be 3,909,832 casings, a decrease of approximately 6.4% below May and 10.0% under June, 1934.

Pneumatic casings in the hands of manufacturers, June 30th amounted to 10,755,400 units, a decrease of 3.4% under stocks on hand May 31st and an increase of 5.2% over stocks on hand June 30, 1934.

The actual figures are as follows:

PNEUMATIC CASINGS

	Shipments	*Production*	*Inventory*
June, 1935	4,262,360	3,909,832	10,755,400
May, 1935	4,067,386	4,175,170	11,130,765
June, 1934	5,228,251	4,342,170	10,219,361

Will Move Aetna Factory

The factory of the Aetna Rubber Company, Ashtabula, Ohio, will be moved to Cleveland in the near future. Following a meeting of the directorate last month S. T. Campbell, president, reported that the plan to move the equipment to Cleveland immediately has been indefinitely postponed and that the Ashtabula plant, which employs some 150 people, will be operated for another month or so. A program to move the company's operations to Cleveland in the near future, however, has already been initiated, according to Mr. Campbell.

British Tire Exports

During the month of June 1935, British exports of automobile casings amounted to 119,619 units, according to the Department of Commerce, valued at £223,259. For the first six months of the current year British exports amounted to 622,883 units with a valuation of £1,168,787. Of this latter amount 94,807 were shipped to British India, 80,538 to Denmark, 61,590 to New Zealand, and the balance to other countries. British South Africa, Netherland India, British Malaya and several South American countries proved good markets for British-made tires in the first six months of 1935. The statistics cited cover domestic exports only, and do not include re-exports or trans-shipments of foreign tires from British ports, according to the Department of Commerce.

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250 STUART STREET BOSTON, MASS.

New Rubber Goods

Sure-Grip Handle Wraps

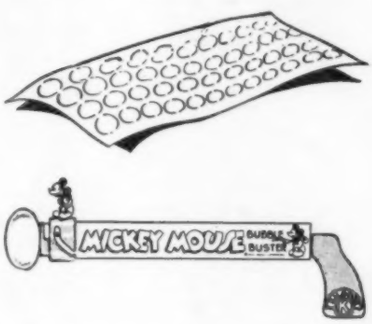
A line of handle-wraps for tennis racquets, golf clubs, baseball bats, and other sport equipment made with handles, has been introduced by the Firelands Health Products Company, Norwalk, Ohio. These wraps are made of latex in one piece. They are made by the steam or water cure process and have a strength of 5,000 lbs. per square inch at an elongation of 850%. Merchandised under the name of "Sure-Grip" each handle-wrap weighs less than ½ ounce, one size fitting all types of handles. Use of Sure-Grip latex wraps assures a positive grip, prevents chafing, and is generally beneficial to the user. They are available in a variety of colors.

Goodyear Stop-Start Tire

Adapted for use on trucks in local freight hauling to combat the grinding wheel action that results from frequent stops and starts in delivery work, Goodyear Tire & Rubber Company, Akron, has developed a Stop-Start tire said to give long, slow even tread wear. It is specifically intended for use on trucks where the speed averages no more than 35 to 45 miles per hour. The tread of the Stop-Start tire is plainer, the shoulders have deeper-cut notches to dissipate what heat generates in service, and the upper shoulder gives the effect of two non-skid treads. The non-skid portion of the tread design is 30% deeper than in standard tires, while the tread rubber underlying the design has been increased in thickness a proportionate amount.

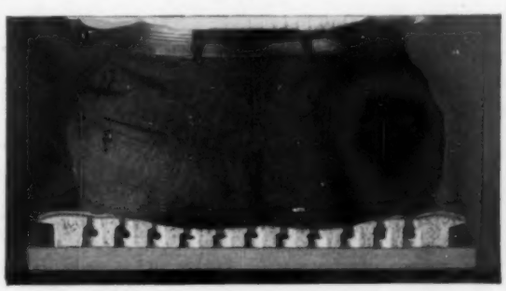
Kilgore Rubber Bubblets

A novel toy pistol which makes and bursts rubber bubblets has been introduced by the Kilgore Manufacturing Company, of Westerville, Ohio, under the name of the Mickey Mouse Bubble Buster. The ammunition, or bubblets, consists of small discs of soft rubber inserted in the muzzle of the gun and expanded by a plunger arrangement in the handle. A sheet of soft rubber, 3 x 9 inches in size, on which is contained 48 bubblets stamped out and ready for use, is supplied with each gun. When placed in the gun muzzle, a stroke of the plunger expands the rubber bubblet to a diameter of 1¼ inches whereupon it bursts with a loud, sharp report. Additional rubber sheets perforated with bubblets are available with or without the gun.



Bickett Respirator Cushion

A chair cushion made of sponge rubber with special features is being merchandised by the L. M. Bickett Company, of Watertown, Wisconsin, under the trade term of the Respirator Chair Cushion. The construction of these cushions is such that the heat retaining and insulating qualities of sponge rubber are eliminated by a method of forced ventilation made possible by a series of perforations not only from the surface of the cushion to the underside but also horizontally. When in use, the air cups in the cushion are compressed, and on resuming their natural shape air currents are created, these currents being distributed throughout the body of the cushion through the lateral tubes, thus drawing in fresh air when the cups expand and expelling air when the cups compress. In such manner is forced ventilation provided for in the Respirator Air Cushion adding to the user's comfort. The illustration shows a cross-sectional view of the cushion in use. Note the cross perforations.



Goodrich R-4 Farm Tire

Designated the R-4, the B. F. Goodrich Company, Akron, has developed a new pneumatic tire for farm service. It has been specially designed for rear wheel service and is available in many sizes. Features of the R-4 are said to include a self-cleaning tread design, balanced distribution of tread rubber, sidewalls amply protected against scuffing when working furrows, wider shoulder cleats, and deep circumferential grooves to resist slipping.

Reflecting Road Studs

A new type of rubber road stud has been introduced by Reflecting Roadstuds, Ltd., 1 Mill-lane, Boothtown, Halifax, which consists of a strong iron base cast *en bloc* and provided with legs designed to stand the heaviest traffic. The inside measurement is 4 x 3½ x 3 inches, the tank being divided vertically into two compartments. Fitted into each compartment by means of a new patent locking device is a reinforced rubber pad in the form of a bridge. Two reflectors are sunk by means of strong metal tubes into each rubber pad at an angle sufficient to give maximum reflecting power at 50 yards. The rubber pads are detachable from the base providing for easy replacement.

Sponge Rubber Padded Saddles

A new type of saddle for streamlined bicycles and velocipedes has been introduced by the Troxel Manufacturing Company, Elyria, Ohio, which is lighter in weight, affords a lower riding position, and is padded with sponge rubber. The padding makes for greater riding comfort. Another feature of the new saddle is a built-in toolbag. It is also equipped with a rear reflector for safety.

MARKETS

RUBBER—COTTON AND FABRICS—CHEMICALS

NEW YORK, SEPTEMBER 9, 1935

Crude Rubber

THE price of crude rubber on the Exchange was steady al lthrough the month of August with little fluctuation. Substantial purchases by factory interests brought the price to a 12 cent figure on August 12, 15, 22 and 23, but it fell off each time due to lack of sustained purchases. The disappointment felt upon publication of the news that August rubber shipments from Malaya had increased by some 3,000 tons in face of an anticipated decline was responsible for the first bad price break in two months, the price on the Exchange falling from 11.79 on August 30 to 11.46 on September 3, the first market day after the Labor Day week-end. Low for the month was reached on September 7 when an 11.43 price was quoted. The Exchange is again operating on Saturdays after having been closed on Saturdays all Summer. Quotations in the outside market, Exchange, London and Singapore, follow:

As of September 9

Plantations—

Ribbed Smoked Sheets—			
No. 1, Spot	—	@	.11½
October-December	—	@	.11¾
No. 2	—	@	.11⅜
No. 3	—	@	.11⅛
No. 4	—	@	.11⅛
Thin Latex Crepe	—	@	.11¾
Thick Latex Crepe	—	@	.11⅝
Brown Crepe, No. 1	—	@	.11⅞
Brown Crepe, No. 2	—	@	.11⅞
Amber Crepe, No. 2	—	@	.11⅞
Amber Crepe, No. 3	—	@	.11⅛
Amber Crepe, No. 4	—	@	.11⅛
Brown Crepe, Rolled	—	@	.10⅜

Latex—

Liquid Latex, per gal.	.48	@	.49

Paras—

Up-River, fine	—	@	.09⅞
Acre Bolivian, fine	—	@	.10⅜
Balata—			
Block, Ciudad	—	@	.30

LONDON MARKET

Standard Smoked Sheets—Buyers—September 9

September	—	@	5 1/16d
Oct.-Dec.	—	@	5 1/16d

SINGAPORE MARKET

Standard Smoked Sheets—Sellers—September 9

September	—	@	5 1/16d
Oct.-Dec.	—	@	5 1/16d

Reclaimed Rubber

September production and shipments of reclaimed rubber continue at about the same satisfactory levels as July and August. At current quotations reclaims are good buys and many manufacturers are contracting ahead for the balance of the year. The outlook for increased consumption appears bright at this writing. Quotations, unchanged since our last report, follow:

High Tensile			
Super-reclaim, black, lb.	.08¼	@	.09
High Tensile Red, lb.	.07	@	.07¼
Shoe			
Unwashed, lb.	.06½	@	.06¾
Washed, lb.	.08	@	.09
Tube			
No. 1 (Floating), lb.	.13	@	—
No. 2 (Compounded), lb.	.07½	@	.07¾
Tires			
Black, lb.	.05	@	.05¼
Black, selected tires, lb.	.05¼	@	.05½
Dark Gray, lb.	.06¼	@	.06½
White, lb.	.09¼	@	.09½
Truck, Heavy Gravity, lb.	.05½	@	.06
Truck, Light Gravity, lb.	.06	@	.06¼
Miscellaneous			
Mechanical blends, lb.	.04¼	@	.04½

Scrap Rubber

Conditions in the scrap field appear to be better generally with increasing shipments reported to foreign markets. Reclaimers are coming through with increased inquiries, particularly on inner tubes. The trade is optimistic as to business during the next few months. Current prices follow:

(Prices to Consumers)

Auto tire peelings, ton	15.00	@	17.50
Mixed auto, ton	7.00	@	8.00
Clean solid truck tires, ton	33.50	@	34.00
Boots and shoes, ton	18.00	@	20.00
Arctics, untrimmed, ton	14.00	@	16.00
Inner tubes, No. 1, lb.	.07½	@	.07¾
Inner tubes, No. 2, lb.	.03¼	@	.03⅜
Inner tubes, Red, lb.	.02¾	@	.03

Cotton

Confusion in the market with regard to the original announcement of the AAA's long-awaited plan on cotton loans resulted in a steady drop in the price of spot cotton during the latter part of August. Since a 12 cent price was reached on August 1, as reported in our previous report, cotton prices have steadily gone downward, breaking below 11 cents on August 24 and reaching a new low in the past several months on August 31 when a 10.65 price was quoted. Rather complicated in its format, the AAA's plan to assist in the marketing of the current crop seems to give reasonable assurance that the grower can dispose of his cotton above 10 cents and be virtually assured that he will net 12 cents by reason of an adjustment payment. Below a 10 cent price he will receive 2 cents as the adjustment figure. There should be considerable interest in the new cotton crop since consumers the world over have permitted their stocks to run to sub-normal levels. Quotations for middling uplands on the N. Y. Cotton Exchange follow:

	August 8	September 9		
	Close	High	Low	Close
September	....	10.41	10.41	10.41
October	11.12	10.58	10.33	10.41
December	11.03	10.54	10.32	10.41

Tire Fabrics

(Prices Net at the Mill—Process Tax Included)

Peeler, carded, 23/5/3, lb.	.33¼	@	.33½
Peeler, carded 23/4/3, lb.	.34¼	@	.34½
Peeler, carded, 15/3/3, lb.	.31¼	@	.31½
Peeler, carded, 13/3/3, lb.	.30¼	@	.30½
Egyptian, carded, 23/5/3, lb.	.45¼	@	.46¼
Egyptian, combed, 23/5/3, lb.	.50¼	@	.51¼
CHAFERS			
Carded, American, 1⅛", lb.	.34	@	.35
Carded, American, 1", lb.	.30	@	.32
LENO BREAKER			
Carded, American, 1⅛", lb.	.34½	@	.35½
Carded, American, 1", lb.	.31	@	.32

Sheetings

Count	Width	Weight			
48x40	36 in.	5.50	lb.	—	@ .05¼
40x40	36 in.	6.15	lb.	—	@ .04¾
40x36	36 in.	6.50	lb.	—	@ .04½
48x48	40 in.	2.50	lb.	—	@ .10½
48x48	40 in.	2.85	lb.	—	@ .09½
56x60	40 in.	3.60	lb.	—	@ .08⅜
48x44	40 in.	3.75	lb.	—	@ .07⅝
44x40	40 in.	4.25	lb.	—	@ .06⅝

Ducks

Enameling, lb.	.32	@	.37½
Belting and Hose, lb.	.34	@	—
Single filling, A grade, lb.	.16¾	@	.17¼
Double filling, lb.	.17¾	@	.18¼

Closing Rubber Prices on New York Commodity Exchange, Inc.

No. 1 Standard Contract of 10 tons

FROM AUGUST 9 TO SEPTEMBER 9

Date	Spot	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sales
Aug. 9	11.94	11.93	12.01	12.07	12.14	12.21	12.28	12.35	12.43	12.49	12.55	12.61	12.67		119
10	—	—	—	—	—	—	—	—	—	—	—	—	—		—
11	—	—	—	—	—	—	—	—	—	—	—	—	—		—
12	12.00	11.97	12.02	12.09	12.16	12.23	12.31	12.38	12.45	12.51	12.57	12.63	12.69		110
13	11.87	11.86	11.91	11.96	12.04	12.12	12.19	12.26	12.33	12.39	12.45	12.51	12.57		121
14	11.90	11.89	11.97	12.04	12.11	12.17	12.24	12.31	12.38	12.44	12.52	12.58	12.64		182
15	12.00	11.98	12.02	12.09	12.16	12.23	12.29	12.37	12.46	12.53	12.60	12.66	12.72		151
16	11.88	11.83	11.88	11.96	12.03	12.10	12.17	12.24	12.29	12.37	12.43	12.49	12.55		170
17	—	—	—	—	—	—	—	—	—	—	—	—	—		—
18	—	—	—	—	—	—	—	—	—	—	—	—	—		—
19	11.70	11.77	11.81	11.88	11.95	12.03	12.10	12.16	12.22	12.29	12.36	12.42	12.48		137
20	11.80	11.81	11.84	11.91	11.97	12.04	12.12	12.19	12.26	12.31	12.37	12.43	12.49		177
21	11.95	11.96	11.99	12.06	12.13	12.20	12.25	12.33	12.41	12.47	12.54	12.60	12.66		246
22	12.00	12.00	12.03	12.10	12.17	12.23	12.31	12.38	12.45	12.51	12.58	12.54	12.71		302
23	12.00	12.02	12.05	12.12	12.18	12.25	12.33	12.39	12.46	12.52	12.59	12.65	12.72		229
24	—	—	—	—	—	—	—	—	—	—	—	—	—		—
25	—	—	—	—	—	—	—	—	—	—	—	—	—		—
26	11.95	11.95	11.98	12.05	12.12	12.19	12.26	12.32	12.38	12.44	12.50	12.57	12.64		283
27	11.75	11.75	11.78	11.84	11.91	11.98	12.05	12.12	12.19	12.25	12.31	12.38	12.45		301
28	11.77	11.78	11.81	11.87	11.94	12.01	12.08	12.14	12.21	12.28	12.35	12.41	12.48		380
29	11.88	11.86	11.89	11.96	12.04	12.12	12.20	12.26	12.32	12.38	12.46	12.52	12.59		665
30	11.79	—	11.79	11.87	11.95	12.04	12.12	12.18	12.25	12.32	12.39	12.45	12.52		176
31	—	—	—	—	—	—	—	—	—	—	—	—	—		—
Sept. 1	—	—	—	—	—	—	—	—	—	—	—	—	—		—
2	—	—	—	—	—	—	—	—	—	—	—	—	—		—
3	11.46	—	11.44	11.50	11.57	11.64	11.72	11.79	11.85	11.91	11.98	12.05	12.11	12.18	405
4	11.63	—	11.63	11.70	11.78	11.86	11.92	11.99	12.07	12.14	12.21	12.27	12.34	12.41	176
5	11.54	—	11.52	11.60	11.68	11.77	11.85	11.92	11.99	12.05	12.13	12.19	12.26	12.33	52
6	11.45	—	11.43	11.51	11.59	11.67	11.75	11.82	11.88	11.94	12.01	12.07	12.13	12.19	159
7	11.43	—	11.41	11.48	11.56	11.65	11.72	11.78	11.85	11.91	11.98	12.04	12.11	12.18	41
8	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9	11.50	—	11.46	11.53	11.61	11.69	11.75	11.83	11.91	11.98	12.05	12.10	12 15	12.21	102

Rubber CHEMICAL Markets

NEW YORK, SEPTEMBER 9, 1935

[All Quotations F.O.B. Works Unless Otherwise Noted]

ACCELERATORS

Organic			
A-1 (Thiocarbanilid)	lb.	.21 @	.25
A-5-10	lb.	.33 @	.36
A-7	lb.	.53 @	.65
A-11	lb.	.60 @	.75
A-16	lb.	.55 @	.65
A-19	lb.	.56 @	.75
A-32	lb.	.70 @	.80
A-17	lb.	— @	—
Aldehyde ammonia, crystals	lb.	.65 @	.67
Altax	lb.	— @	—
Captax	lb.		
Crylene	lb.	.55 @	.65
paste	lb.	.45 @	.55
Di-Ortho-Tolyguanidine	lb.	.44 @	.47
Diphenylguanidine	lb.	.35 @	.37
Ethylidene aniline	lb.	.45 @	.47½
Formaldenyde aniline	lb.	.37½ @	.42
Guantal	lb.	.42 @	.51
Heptene	lb.	.40 @	—
Hexamethylene-tetramine	lb.	.37 @	—
Lead Oleate, No. 999	lb.	.13 @	—
Witco	lb.	.11 @	—
Lithex	lb.	.18 @	.20
Methylenedianiline	lb.	.36 @	.37
Monex	lb.	3.25 @	—
Oxynone	lb.	.68 @	.80
Phenex	lb.	.50 @	.55
Pipsolene	lb.	3.55 @	4.00
R & H 40	lb.	.40 @	.41
R & H 50	lb.	.40 @	.41
R-2	lb.	1.55 @	1.90
Safex	lb.	1.20 @	1.25
SPDX	lb.	.75 @	—
Super-Sulphur No. 1	lb.		
No. 2	lb.		
Thiocarbanilid, drums	lb.	.21 @	.25
Trimene	lb.	.75 @	—
base	lb.	1.20 @	—
Triphenylguanidine	lb.	.58 @	.60
Tuads	lb.		
Ureka	lb.	.62 @	1.00
Ureka B	lb.	— @	—
Ureka C	lb.	.58 @	.69
Vulcanex	lb.		
Vulcone	lb.		
Vulcanol	lb.		
Z-88-P	lb.	.48 @	.60
Zimate	lb.		
Inorganic			
Litharge, domestic	lb.	.06½ @	—
Magnesia, calcined, heavy	ton	60.00 @	65.00

COLORS

Blacks (See Compounding Materials)

Blues			
Prussian	lb.	.37 @	.39
Ultramarine	lb.	.12 @	.14
Browns			
Sienna, Italian	lb.	.06 @	'13
Umber, Turkey	lb	.04 @	.04½
Greens			
Chrome, light	lb.	.20 @	.30
medium	lb.	.21 @	.31
Chromium Oxide, bbl.	lb.	.22 @	.23
Guignet's Green	lb.	.75 @	—
Reds			
Antimony			
crimson, 15/17	lb.	.48 @	—
sulfur, free	lb.	.48 @	.60
Indian English	lb.	.09 @	.10
Domestic (Maroon)	lb.	.11 @	—
Red oxide, pure	lb.	.10 @	.12
Rub-Er-Red, f.o.b Easton	lb.	.09½ @	—
Whites			
Cryptone CB, No. 21	lb.	.06 @	.06½
Cryptone, No. 19	lb.	.06 @	.06½
Cryptone, ZS-20	lb.	.10½ @	.10¾
Cryptone, ZS-86	lb.	.10½ @	.10¾
Lithopone			
Albalith, black label—11	lb.	.04½ @	.04¾
Azolith	lb.	.04½ @	.04¾
Rayox	lb.		
Titanium oxide	lb.	.17 @	.19
Titanox B	lb.	.06 @	.06½
Titanox C	lb.	.06 @	.06½
Zinc Oxide—American Process			
American Azo:			
ZZZ (lead free)	lb.	.05¾ @	.06
ZZ (leaded)	lb.	.05½ @	.05¾
Horsehead Lead Free Brand:			
Special—3	lb.	.05¾ @	.06
XX Red—4	lb.	.05¾ @	.06
XX Red—72	lb.	.05¾ @	.06
XX Red—78	lb.	.05¾ @	.06
XX Red—103	lb.	.05¾ @	.06
U. S. P.—X, bbls.	lb.	.12½ @	.12¾
Kadox, black label—15	lb.	.09¾ @	.09¾
Blue label—16	lb.	.08¾ @	.08¾
Red label—17	lb.	.07 @	.07¼
St. Joe, black label	lb.	.05¾ @	.06
green label	lb.	.05¾ @	.06
red label	lb.	.05¾ @	.06
Zinc Oxide—French Process			
Anaconda, lead free	lb.	.05¾ @	.06
Anaconda, selected lead free	lb.	.06 @	.06¾
Florence White seal—7 bbls.	lb.	— @	.10¾
Green seal—8	lb.	.09¾ @	.09¾
Red seal—9	lb.	.08¾ @	.08¾
Yellows			
Chrome	lb.	.15 @	.16
Ocher, dom. med.	lb.	.02¾ @	—

BLACKS

Arrow "Aerfloted" Specification	lb.	.0535 @	.0825
Bone, powdered	lb.	.05½ @	.12½
Carbon, compressed	lb.	.0535 @	.0825
uncompressed	lb.	.0535 @	.0825
"Certified," Cabot	lb.	.0535 @	.0825
Spherons	lb.	.0535 @	.0825
"Disperso"	lb.	.0535 @	.0825
Drop, bbls.	lb.	.05½ @	.14
"Excello," compressed	lb.	.0535 @	.0825
"Fumonex"	lb.	.03 @	.07
"Gastex"	lb.	.03 @	.07
Lampblack	lb.	.07 @	.12
"Micronex"	lb.	.0535 @	.0825
"Supreme"	lb.	.0535 @	.0825
Thermatomic—"P 33"	lb.	— @	—
"Thermax"	lb.	— @	—
United "Dixie" & "Kosmos"	lb.	.0535 @	.0825

COMPOUNDING MATERIALS

Aluminum Flake	ton.	21.85 @	24.50
Ammonia carbonate, lump	lb.	.10½ @	.12
Asbestine	ton	14.00 @	15.00
Barium carbonate (98-100%)	ton	56.50 @	61.50
Barium Dust	lb.	.05 @	.06
Barytes	ton	22.00 @	24.00
Basofor	lb.	.04½ @	—
Bentonite	lb.	.02 @	.03
Blanc fixe dry f.o.b. works	ton	70.00 @	75.00
Calcene	ton	35.00 @	43.00
Catalpo (fact.)	lb.	.02 @	—
Chalk, precipitated			
Suprex white, extra lt.	ton	45.40 @	60.00
heavy	ton	45.00 @	55.00
Clay, Kaolin, domestic	ton	7.50 @	15.00
Aerfloted, Suprex	ton	8.50 @	10.00
Congaree	ton	9.00 @	—
Dark Blue Ridge	ton		
Dixie	ton		
Dixie, Jr.	ton		
Lexington	ton	10.00 @	22.00
McNamee	ton		
Par	ton		
Tensulite		15.00 @	—
Witco	ton	8.50 @	9.00
Cotton Flock	lb.	.10½ @	.18
Glues, extra white	lb.	.28 @	.30
medium white	lb.	.14 @	.19
Kalite No. 1	ton	30.00 @	55.00
Kalite No. 3	ton	40.00 @	65.00
Magnesium carbonate	lb.	.08 @	—
Mica	ton	65.00 @	80.00
Pyrax A	ton	— @	—
Rottenstone (powdered)	lb.	.02½ @	.05
Soapstone, powdered	ton	16.00 @	22.00
Starch, powdered	cwt.	3.56 @	3.76
Talc, domestic	ton	12.00 @	15.00
Whiting, commercial	ton	17.00 @	18.00
Columbia Filler	ton	9.00 @	14.00
English Cliffstone	ton	33.00 @	43.00
Sussex	ton		
Witco	ton	15.00 @	—
Wood Flour	ton	18.00 @	30.00
Zinc Carbonate	lb.	.10½ @	.11
Zinc Stearate	lb.	.26 @	—

MINERAL RUBBER

Black Diamond	ton	27.00 @	—
Genasco, solid (factory)	ton	25.00 @	27.00
Hard Hydrocarbon	ton		
Parmr, solid	ton	25.00 @	28.00
Pioneer, MR, solid	ton		
Pioneer-granulated	ton		

SPECIALTIES

Aromatics—Rodo	lb.		
Para-Dors No. 5145	lb.	2.00 @	—
Sunproof	lb.	.35 @	.37½
Sponge Paste	lb.	— @	.80
Tonox	lb.	.56 @	.60

SOFTENERS

Acids			
Acetic, 28%, bbls.	100 lb.	2.45 @	2.70
glacial, USP, bbls.	100 lb.	14.00 @	—
Nitric, 36 degrees	cwt.	5.00 @	6.00
Sulfuric, 66 degrees	ton	15.50 @	16.50
Acids, Fatty			
Laurex	lb.	.15 @	.16
Stearex	lb.	.08½ @	.13
Stearic, double pressed	lb.	.09 @	.14
Alkalies			
Caustic Soda, 76%	cwt.	3.60 @	3.75
Soda Ash, 58% C.L.	cwt.	2.52 @	—
Oils			
Corn, refined, bbls.	lb.	.12½ @	—
Cottonseed, crude	gal.	.093 @	.10
Cycline Oil	gal.	.15 @	.28
Degras (c.l. 100 bbls.)	lb.	.02¾ @	—
Less c.l. (10-25 bbls.)	lb.	.03 @	—
Lots less than 10 bbls.	lb.	.03¼ @	—
Fluxrite	lb.	.05½ @	.06½
Palm Lagos	lb.	.05 @	—
Niger	lb.	.04¼ @	—
Para-Flux	gal.	.17 @	—
Petrolatum, light	lb.	.02 @	.02½
Pigmentaroil, tank cars	gal.	.16 @	—
in drums	gal.	.22 @	.23½
Pine, steam distilled	gal.	.64 @	.65
dest. dist., drums	gal.	.40 @	.45
Rosin Oil, cmpd	gal.	.40 @	—
Rubtack	lb.	.40 @	—
Seedine, c.l.	lb.	.07¼ @	—
Tackol	lb.	.08½ @	.18
Witco Palm Oil	lb.	.05 @	—
Witco Softener (f.o.b. wks.)	gal.	.15 @	—
Woburn No. 8, c.l.	lb.	.06 @	—
Wobonite, c.l.	lb.	.05 @	—
Resins and Pitches			
Pitch, Burgundy	lb.	.07 @	.08
coal tar	gal.	.07½ @	.08
hardwood	ton	25.00 @	30.00
pine, 200 lb. gr. wt.	bbl.	6.50 @	—
Rosin, grade K, 280 lb.	bbl.	5.55 @	—
Pigmentar, tank cars	gal.	.19 @	—
in drums	gal.	.25 @	.27
R. S. L. Resin	lb.	— @	—
Retort Pine Tar, drums	bbl.	12.00 @	13.00
Solvents			
Acetone, pure	lb.	.12½ @	.13½
Alcohol, denatured, methanol, No. 1 bbls.	gal.	.29½ @	—
Benzene, 90%	gal.	.15 @	.24
Beta-Trichlorethane	gal.	— @	—
Bondogen	lb.	— @	—
Carbon, bisulfide	lb.	.05½ @	.06
Carbon, tetrachloride	lb.	.05 @	.05¾
Dichlorethylene	lb.	.29 @	—
Dipentene, cml., drums	gal.	.41 @	.44
Dryolene (f.o.b. Okla.)	gal.	.10 @	.10½
Ethylene dichloride	lb.	.05½ @	.06½
Gasoline, steel bbls.	gal.	.16 @	—
Naphtha, solvent	gal.	.26 @	.31
Plastogen	lb.		
Reogen	lb.		
Rub-Sol (f.o.b. Okla.)	gal.	.09 @	—
Trichlorethylene	lb.	— @	.09½
Turpentine, spirits	gal.	.46½ @	.50½
dest. dist., drums	gal.	.45 @	.48
Waxes			
Beeswax, white	lb.	.40 @	.41
Carnauba, yellow	lb.	.39 @	.40
Ceresin, white, dom.	lb.	.08 @	.11
Montan, crude	lb.	.10 @	.11
Ozokerite, black	lb.	.24 @	.25
green	lb.	.26 @	.30
Paraffin (c.l.—f.o.b. N. Y.)			
Yellow crude scale	lb.	.02 @	.02½
White crude scale 124/126	lb.	.02 @	.02½
Refined, 125/127	lb.	.03¼ @	.04

ANTI-OXIDANTS

AgeRite, Gel	lb.		
HP	lb.		
Powder	lb.		
Resin	lb.		
White	lb.		
Albasan	lb.	.70 @	.75
Antox	lb.		
B-L-E	lb.	.57 @	.60
Flectol-H	lb.	— @	—
Flectol White	lb.	— @	—
Flectol B	lb.	— @	—
Neozone	lb.		
Oxynone	lb.	.66 @	.90
Retardex	lb.	.35 @	.40
Stabilite	lb.	.57 @	.62
Stabilite Alba	lb.	.70 @	.75
VGB	lb.	.55 @	.60

MOLD LUBRICANTS

Aresklene	lb.	— @	—
Cocoa Soapstock	lb.	.06 @	.08
Dipex	lb.	.06 @	.08
Rusco, f.o.b. Nitro	lb.	.12 @	.30
Sericite, f.o.b. N. Y.	ton	65.00 @	—
Soap Tree Bark, cut, sifted	lb.	.06 @	.08
Zip (Mold Wash)	lb.	— @	—

FACTICE OR RUBBER SUBSTITUTES

Amberex	lb.	.23 @	—
Black	lb.	.08½ @	—
White	lb.	.08 @	.12
Brown	lb.	.07 @	.11½
Duphax	lb.	.09½ @	—

VULCANIZING INGREDIENTS

Sulfur Chloride, yellow (drs.)	lb.	.03½ @	.04
Sulfur flour.			
Refined, 100% pure (bags)	cwt.	3.45 @	—
Commercial (bags)	cwt.	1.95 @	2.80
Telloy	lb.		
Vandex	lb.		

Crude Rubber
Latex and Guayule
Reclaimed Rubber
Tires and Tubes

STATISTICS OF THE INDUSTRY

Rim Production
Automobiles
Gasoline
Cotton Prices

U. S. Imports and Exports of Crude Rubber

YEARS	Gross Imports: Long Tons	Gross Imports: Total Declared Value	Gross Imports: Average Declared Value per pound Cents	Re-exports: Long Tons	Re-exports: Total Declared Value	Re-exports: Average Declared Value per pound Cents	Net Imports: Long Tons
1922	301,076	101,843,188	15.10	4,809	1,921,828	17.84	296,267
1923	309,144	185,060,304	26.72	8,772	5,672,319	28.87	300,372
1924	328,056	174,231,331	23.71	10,309	6,057,637	26.23	317,747
1925	396,642	429,705,014	48.36	14,827	19,847,753	59.76	381,815
1926	413,338	505,817,807	54.63	17,671	22,470,583	56.77	395,667
1927	426,258	339,874,774	35.60	27,775	24,735,488	39.76	398,483
1928	439,731	244,854,973	25.03	32,159	18,128,361	25.17	407,572
1929	560,084	239,178,783	19.15	36,485	16,868,733	20.64	523,599
1930	482,082	139,134,330	12.89	30,205	9,316,205	13.77	451,877
1931	497,138	72,918,949	6.54	25,595	4,255,472	7.42	471,543
1932	409,584	31,936,459	3.47	20,929	2,015,612	4.30	388,655
1933	467,817	44,034,064	4.82	20,537	2,601,352	5.65	427,280
1934	449,322	97,898,519	10.06	23,848	5,770,109	11.23	425,615
1933:							
August	44,257	5,391,709	5.44	2,205	302,132	6.12	42,052
Sept.	44,912	6,110,956	6.07	2,369	335,798	8.89	42,543
Oct.	44,474	6,115,330	6.14	2,669	397,167	6.64	41,805
Nov.	40,582	5,850,714	6.44	2,188	333,631	6.81	38,394
Dec.	39,461	5,869,556	6.75	1,888	293,690	6.94	37,573
1934:							
Jan.	47,963	7,403,123	6.89	1,975	352,116	7.96	45,988
Feb.	34,335	5,262,711	6.84	2,133	476,232	9.97	32,202
Mar.	41,119	6,765,173	7.34	2,947	583,313	8.83	38,172
April	43,841	8,232,746	8.37	2,814	588,453	9.18	41,027
May	48,494	10,001,239	9.21	2,389	544,212	10.17	46,105
June*	47,289	10,747,464	10.14	2,012	501,499	11.33	45,277
July	41,443	9,670,617	10.41	2,366	660,199	13.99	39,077
August	31,531	7,873,690	11.15	1,393	400,433	12.83	30,138
Sept.	31,074	8,293,859	11.92	1,665	474,446	12.72	29,409
Oct.	28,318	8,203,447	12.93	2,058	620,754	13.46	26,260
Nov.	36,325	10,470,076	12.87	1,230	327,672	11.89	35,095
Dec.	17,590	4,974,374	12.62	866	240,780	12.46	16,724
1935:							
Jan.	39,675	10,852,308	12.21	977	278,229	12.72	38,698
Feb.	47,271	12,291,242	11.61	1,845	480,440	11.62	45,426
March	45,350	11,801,152	11.62	1,868	486,379	11.62	43,482
April	39,735	10,096,487	11.34	1,096	285,903	11.64	38,639
May	29,278	7,171,025	10.98	793	202,402	11.39	28,485
June	31,240	7,523,598	10.75	524	153,595	13.10	30,716
July	46,987	11,666,577	11.08	489	132,173	12.06	46,498

* Revised.

United States Imports of Guayule, Balata, Jelutong, Liquid Latex

(All Quantities in Long Tons)

	Guayule: Tons	Guayule: Dollars	Balata: Tons	Balata: Dollars	Jelutong: Tons	Jelutong: Dollars	Liquid Latex (1): Tons	Liquid Latex (1): Dollars
1924	1,356	536,392	464	568,456	6,165	1,237,100	2,157	864,059
1925	3,781	1,803,448	517	574,750	6,749	1,642,531	3,853	3,537,810
1926	4,305	2,562,096	354	327,213	7,263	3,127,757	3,388	4,680,386
1927	5,018	2,674,957	582	447,246	7,785	2,448,657	1,116	876,077
1928	3,075	1,755,685	731	430,855	7,552	2,540,059	4,167	2,185,579
1929	1,231	545,175	728	566,964	8,203	2,458,136	3,728	1,787,997
1930	1,096	347,388	501	422,684	5,907	1,403,244	4,449	1,506,804
1931	—	—	1,208	411,692	5,777	1,019,010	4,650	884,355
1932	—	—	708	147,403	4,607	616,596	5,085	601,999
1933	—	—	1,658	2,261,869	5,989	944,895	11,085	1,833,671
1934	402	75,349	1,054	438,209	4,988	943,752	13,070	3,633,253
1934:								
August	100	18,607	100	36,732	516	85,651	1,169	369,335
Sept.	—	—	48	14,415	259	47,542	936	312,967
Oct.	—	—	14	2,797	278	48,287	922	282,503
Nov.	—	—	60	20,169	332	60,904	887	296,447
Dec.	—	—	6	2,458	192	31,947	581	184,588
1935:								
Jan.	—	—	81	34,687	448	80,097	848	287,583
Feb.	—	—	62	20,981	222	33,850	573	179,583
March	—	—	57	15,917	488	80,643	1,290	354,654
April	—	—	51	11,452	419	58,429	1,721	415,100
May	51	9,464	62	12,931	332	51,805	1,427	380,844
June	105	19,502	75	23,809	330	50,165	591	152,665
July	51	9,800	49	15,758	388	62,736	1,144	303,518

(1) Weight given in pounds of dry rubber contained in latex.

U. S. Consumption of Crude Rubber

(Rubber Manufacturers' Association statistics raised to 100 per cent—All figures in long tons)

(All Quantities in Long Tons)

	Figures on Monthly Basis: 1928	1929	1930	1931	1932	1933	1934	1935
Jan.	34,403	43,002	36,194	28,557	29,648	22,645*	39,284*	47,103
Feb.	33,702	41,594	33,302	28,797	31,821	21,392*	40,609	43,187
Mar.	35,688	44,730	35,540	32,788	29,505	17,483*	47,097	42,620
Apr.	32,772	47,521	39,686	33,321	27,518	25,928	44,853*	44,714
May	37,333	49,233	39,386	37,817	30,957	44,074	42,918*	41,568
June	37,676	43,227	34,195	37,916	41,475	50,743*	40,147*	36,623
July	37,407	41,526	29,508	31,397	29,976	49,614*	32,553*	36,384
Aug.	42,927	38,274	30,850	27,586	23,721	44,428*	33,310	
Sept.	39,882	34,707	25,515	23,638	23,847	35,281*	30,352	
Oct.	40,857	34,800	27,516	22,277	22,286	31,543*	31,347	
Nov.	37,461	27,659	23,691	22,943	23,231	28,831*	34,842	
Dec.	31,232	25,531	21,687	21,409	18,015	28,757*	36,662	
Tot.	441,340	469,804	375,980	348,986	332,000	400,719*	454,350*	

* Revised.

Reclaimed Rubber in the United States

(All Quantities in Long Tons)

Year	Production	Consumption: Tons	Consumption: % to Crude	Stocks*	Year	Production	Consumption: Tons	Consumption: % to Crude	Stocks*
1925	132,930	137,105	35.6	13,203	1930	157,967	153,497	40.8	22,004
1926	180,582	164,500	45.9	23,213	1931	133,351	124,126	33.9	19,257
1927	189,144	178,471	47.6	24,980	1932	75,608	77,504	23.4	16,354
1928	208,516	223,000	50.4	24,785	1933	99,560	81,602	19.9	20,746
1929	218,954	226,588	48.4	27,464	1934	110,010	100,597	22.3	23,079

	Figures on Monthly Basis: Production	Consumption: Tons	Consumption: % to Crude	Stocks*		Production	Consumption: Tons	Consumption: % to Crude	Stocks*
1934:									
Jan.	9,828	7,000	17.8a	24,263	July	9,446	8,175	25.1a	24,926
Feb.	9,504	7,646	18.8	23,356	Aug.	8,160	8,493	25.5	24,607
Mar.	11,479	9,683	20.6	25,113	Sept.	6,974	7,028	23.2	24,540
Apr.	10,185	9,387	20.9	22,033	Oct.	8,145	8,167	26.1	24,511
May	10,848	9,500	22.1	22,887	Nov.	7,268	7,775	22.3	23,999
June	10,820	9,459	23.5	23,664	Dec.	7,353	8,284	22.6	23,079
1935:									
Jan.	10,465	11,261	23.9	22,291	July	8,421	8,396	23.1	17,810
Feb.	10,072	9,374	23.3	22,989	Aug.	.....	.....	...	.....
Mar.	10,549	9,741	22.9	20,637	Sept.	.....	.....	...	.....
Apr.	10,315	10,466	23.4	18,716a	Oct.	.....	.....	...	.....
May	10,223	9,938	23.9	18,541	Nov.	.....	.....	...	.....
June	8,590	8,710	23.8	17,932	Dec.	.....	.....	...	.....

* Stocks on hand at the end of month or year.
a Revised.

U. S. Consumption of Gasoline

(Bureau of Mines Statistics)

(In Thousands of Barrels of 42 Gallons)

	1933 *	1934 *	1935		1933 *	1934 *	1935
January	26,397	29,489	28,062	August	37,400	39,105	
February ..	23,320	25,310	26,432	September .	34,580	34,669	
March	28,123	30,577	31,997	October	33,022	37,674	
April	29,791	32,736	36,076	November .	30,312	34,998	
May	33,709	38,071	39,089	December .	28,572	30,581	
June	37,699	36,430	37,884				
July	34,087	37,466	41,203	Total	377,003	407,106	

* Revised on basis of final annual figures issued by Bureau of Mines.

Rims Inspected and Passed in U. S.

(Tire and Rim Association Reports)

	Total		Total		Total
1924	21,863,311	1928	24,247,282	1932	6,261,336
1925	26,001,664	1929	24,141,502	1933	8,713,962
1926	24,199,524	1930	17,364,096	1934	12,255,118
1927	19,700,003	1931	11,253,800	1935	.....

1935:		1935:		1934:	
January ...	1,868,723	May	1,561,434	September .	526,472
February ..	1,616,398	June	1,428,314	October ...	629,878
March	1,724,077	July	1,339,353	November .	577,713
April	1,907,032	August	797,827	December ..	1,199,240

Daily Spot Closing Prices of Ribbed Smoked Sheet Rubber—New York Market, in Cents per Pound

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Ave.
1933																																
May	4 5/16	4 7/16	4 7/8	4 5/16	4 11/16	4 11/16	—	4 11/16	4 5/16	4 11/16	5	5 1/16	5 5/16	—	4 7/16	4 11/16	4 11/16	4 11/16	4 11/16	4 11/16	—	4 11/16	4 5/16	5 1/16	5 5/16	5 5/16	5 5/16	5 5/16	5 5/16	—	6 1/4	5
June	4 5/16	6 1/2	6 7/16	—	6 11/16	6 7/16	—	6 7/16	6 5/16	6 7/16	7 1/16	7 1/16	6 5/16	—	5 11/16	5 5/16	5 5/16	5 5/16	5 11/16	5 5/16	6 5/16	6 5/16	6 5/16	6 5/16	6 5/16	6 5/16	6 5/16	6 5/16	6 5/16	—	—	6 5/16
July	6 5/16	—	—	—	6 7/16	7 5/16	—	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	6 11/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	—	7 5/16	7 5/16
August	7 5/16	7 5/16	—	7 5/16	—	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16
September	7 5/16	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
October	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
November	7 5/16	7 5/16	8	8 1/4	—	7 11/16	8	—	8 5/16	—	8 5/16	8 5/16	8 5/16	8 5/16	9	8 5/16	8 5/16	9 1/16	8 5/16	8 5/16	9	9 1/16	8 11/16	9 1/16	9 1/16	8 7/16	8 5/16	8 5/16	8 5/16	8 5/16	8 5/16	8 5/16
December	9 1/4	9 1/4	—	9 1/4	9 5/16	9 1/16	9 1/16	8 5/16	8 5/16	—	8 5/16	8 5/16	8 5/16	8 5/16	8 5/16	8 5/16	8 5/16	8 11/16	8 5/16	8 11/16	8 11/16	9 1/16	8 11/16	9 1/16	9 1/16	8 7/16	8 5/16	8 5/16	8 5/16	8 5/16	8 5/16	8 5/16
1934																																
January	9	9 7/16	8 11/16	9	9	9	10 5/16	8 5/16	9	8 5/16	8 5/16	8 5/16	8 5/16	8 5/16	9 1/16	9 1/16	10 1/16	9 1/16	9 1/16	9 3/16	10 1/16	10 1/16	9 5/16	10 1/16	10 1/16	10 1/16	10 1/16	10 1/16	10 1/16	10 1/16	10 1/16	9 15/16
February	10 1/16	10 1/2	9 11/16	—	10 1/16	10 5/16	10 5/16	10 1/16	10 1/16	10 1/16	10 1/16	10 1/16	10 1/16	10 1/16	10 1/16	10 1/16	10 1/16	10 1/16	10 1/16	10 1/16	10 1/16	10 1/16	10 1/16	10 1/16	10 1/16	10 1/16	10 1/16	10 1/16	10 1/16	10 1/16	10 1/16	10 1/16
March	10 1/16	11 1/4	10 11/16	11 5/16	10 1/16	10 5/16	10 5/16	10 1/16	10 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16	11 1/16
April	11 1/16	11 1/4	11 7/16	15	15 5/16	11 5/16	11 5/16	15 1/16	14	13 1/16	13 5/16	13 5/16	12	12 1/16	13 5/16	13 5/16	13 5/16	12 1/16	13	13	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16
May	14 3/16	14 7/16	14 7/16	12 13/16	13 5/16	13 5/16	13 5/16	15 1/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16
June	13	13	14 5/16	12 13/16	14 5/16	14 5/16	13 5/16	14 5/16	14 5/16	14 5/16	14 5/16	14 5/16	14 5/16	14 5/16	14 5/16	14 5/16	14 5/16	14 5/16	14 5/16	14 5/16	14 5/16	14 5/16	14 5/16	14 5/16	14 5/16	14 5/16	14 5/16	14 5/16	14 5/16	14 5/16	14 5/16	14 5/16
July	14	14 7/16	15	13	14 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16
August	14 7/16	14 7/16	15	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16
September	14 7/16	14 1/2	13 7/16	15 5/16	15 11/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16
October	14 1/2	13 5/16	13	14	13	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16
November	13 5/16	13 5/16	12 7/16	—	13	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16
December	13 5/16	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1935																															
January	—	13 5/16	13 5/16	13 5/16	13 5/16	12 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	—	13 5/16	12 7/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	12 7/16	13 5/16	13 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	13 5/16
February	—	12 3/4	12 3/4	12 3/4	12 3/4	12 5/16	12 5/16	13 7/16	13 5/16	13 5/16	13 5/16	13 5/16	13	13 5/16	13	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16
March	—	12 5/16	—	12 3/4	12 5/16	12	12 5/16	12 7/16	12	11 3/4	11 3/4	11 3/4	11 7/16	12 7/16	12	11 3/4	11 3/4	12 7/16	12	11 3/4	12	12	11 3/4	12	12	11 3/4	11 3/4	11 3/4	11 3/4	11 3/4	11 3/4
April	—	11 1/4	11 7/16	11 7/16	11	—	11 1/2	10 1/16	11 3/16	11 3/16	11 3/16	11 3/16	11 3/16	12 3/4	12 3/16	12 3/16	12 3/16	12 3/16	12 3/16	12 3/16	12 3/16	12 3/16	12 3/16	12 3/16	12 3/16	12 3/16	12 3/16	12 3/16	12 3/16	12 3/16	12 3/16	12 3/16
May	—	11 1/16	11 7/16	11 7/16	11 7/16	11 7/16	11 7/16	11 5/16	11 7/16	11 7/16	11 7/16	11 7/16	11 7/16	11 7/16	11 7/16	11 7/16	11 7/16	11 7/16	11 7/16	11 7/16	11 7/16	11 7/16	11 7/16	11 7/16	11 7/16	11 7/16	11 7/16	11 7/16	11 7/16	11 7/16	11 7/16	11 7/16
June	—	12 1/16	12 7/16	12 1/2	12 1/2	12 1/2	12 1/2	12 3/16	12 3/16	12 3/16	12 3/16	12 3/16	12 3/16	12 3/16	12 3/16	12 3/16	12 3/16	12 3/16	12 3/16	12 3/16	12 3/16	12 3/16	12 3/16	12 3/16	12 3/16	12 3/16	12 3/16	12 3/16	12 3/16	12 3/16	12 3/16	12 3/16
July	—	12 1/16	12 3/4	—	12 1/16	12 1/16	—	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16
August	—	12 1/16	—	—	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16	12 1/16
September	—	12 1/16	11 1/2	11 1/16	11 7/16	12 1/16	12 1/16	12 1/16	12	11 1/2	11 1/2	11 1/2	11 1/2	11 1/2	11 1/2	11 1/2	11 1/2	11 1/2	11 1/2	11 1/2	11 1/2	11 1/2	11 1/2	11 1/2	11 1/2	11 1/2	11 1/2	11 1/2	11 1/2	11 1/2	11 1/2	11 1/2

Average Spot Closing Prices—Ribbed Smoked Sheets

(New York Market)

Average Price per Pound for Years 1910-1929

Year	Cents	Year	Cents	Year	Cents	Year	Cents	Year	Cents
1910	206.60	1914	65.33	1918	60.15	1922	17.50	1926	48.50
1911	141.30	1915	65.85	1919	48.70	1923	29.45	1927	37.72
1912	121.60	1916	72.50	1920	36.30	1924	26.20	1928	22.48
1913	82.04	1917	72.23	1921	16.36	1925	72.46	1929	20.55

Average Monthly Price per Pound Since 1928

	1929 Cents	1930 Cents	1931 Cents	1932 Cents	1933 Cents	1934 Cents	1935 Cents
Jan.	20.14	15.24	8.34	4.38	3.08	9.32	13.10
Feb.	23.7	15.85	7.70	4.03	2.95	10.45	12.92
Mar.	24.55	15.34	7.71	3.35	3.01	11.01	11.51
Apr.	21.18	14.93	6.43	3.02	3.56	12.10	11.55
May	21.46	14.24	6.49	3.09	4.95	13.26	12.05
June	20.64	12.45	6.35	2.66	6.15	13.51	12.57
July	21.30	11.24	6.37	2.89	8.01	14.60	12.10
Aug.	20.59	9.96	5.38	3.63	7.31	15.47	11.98
Sept.	20.37	8.28	5.08	3.84	7.30	15.36	
Oct.	19.67	8.20	4.87	3.65	7.64	13.96	
Nov.	16.62	9.01	4.65	3.44	8.66	13.04	
Dec.	16.12	9.05	4.64	3.24	8.87	12.98	
Average for Year	20.55	11.98	6.17	3.49	5.96	12.92	

London Closing Prices of Ribbed Smoked Sheets

(In Pence Per Pound)

Day	June	July	Aug.	Sept.	Day	June	July	Aug.	Sept.
1	5 1/8	5 1/8	5 1/8	—	17	6 1/16	5 1/8	—	
2	—	5 1/8	5 3/4	5 3/16	18	6 1/16	5 3/4	—	
3	5 1/8	5 7/8	—	5 3/16	19	6 1/16	5 1/8	5 5/16	
4	6	5 1/16	—	5 1/16	20	6	—	5 5/16	
5	6	5 1/16	—	5 1/16	21	6	—	5 1/16	
6	6	—	5 1/8	5 1/16	22	—	5 3/4	5 1/16	
7	6	—	5 3/4	5 1/16	23	—	5 3/4	5 1/16	
8	—	5 1/8	5 1/16	—	24	6	5 5/16	—	
9	—	5 1/16	5 3/4	5 1/2	25	6	5 3/4	—	
10	—	5 7/8	—		26	5 1/8	5 5/8	5 1/16	
11	6 1/16	5 7/8	—		27	5 1/8	—	5 5/8	
12	6 1/8	5 1/8	5 3/4		28	6	—	5 5/8	
13	6 1/8	—	5 1/16		29	—	5 1/8	5 1/16	
14	6 1/8	—	5 1/16		30	—	5 3/4	5 5/8	
15	6 1/8	5 7/8	5 1/16		31	—	5 1/8	—	
16	—	5 3/4	5 1/16						

Average Monthly Price Per Pound

Month	1932 Pence	1933 Pence	1934 Pence	1935 Pence	Month	1932 Pence	1933 Pence	1934 Pence	1935 Pence
Jan.	3.052	2.264	4.429	6.434	Aug.	2.654	3.811	7.401	5.696
Feb.	2.760	2.093	4.920	6.292	Sept.	2.485	3.728	7.409	
Mar.	2.047	2.099	5.136	5.745	Oct.	2.425	3.957	6.806	
Apr.	1.876	2.323	5.712	5.604	Nov.	2.518	4.096	6.294	
May	1.825	2.966	6.207	5.822	Dec.	2.444	4.200	6.295	
June	1.750	3.392	6.245	6.027	Average for Year	2.434	3.233	6.159	
July	1.875	3.860	7.053	5.801					

Spot Closing Cotton Prices

(Middling Upland Grade—New York Market)

Recent Daily Price Per Pound

Date	July	Aug.	Sept.	Date	July	Aug.	Sept.	Date	July	Aug.	Sept.
1	12.15	12.00	—	11	12.35	—		21	—	11.65	
2	12.35	11.95	—	12	12.45	11.50		22	12.25	11.70	
3	12.45	11.90	10.65	13	12.35	11.35		23	12.10	11.10	
4	—	—	10.70	14	—	11.55		24	12.25	10.85	
5	12.20	11.90	10.65	15	12.40	11.70		25	12.00	—	
6	12.35	11.95	10.75	16	12.25	11.75		26	12.15	10.85	
7	—	11.85	10.70	17	12.35	11.80		27	12.15	11.05	
8	12.30	11.65	—	18	12.35	—		28	—	10.95	
9	12.40	11.60	10.75	19	12.30	11.80		29	12.05	10.80	
10	12.45	11.60		20	12.20	11.70		30	12.00	10.75	
								31	12.10	10.65	

Average Monthly Price Per Pound

	1932 Cents	1933 Cents	1934 Cents	1935 Cents		1932 Cents	1933 Cents	1934 Cents	1935 Cents
Jan.	6.65	6.23	11.25	12.70	Aug.	7.43	9.55	13.40	11.48
Feb.	6.85	6.05	12.28	12.58	Sept.	6.30	9.64	13.00	
Mar.	6.86	6.39	12.30	11.63	Oct.	6.30	9.58	12.48	
Apr.	6.16	7.02	11.80	11.73	Nov.	6.22	10.04	12.53	
May	5.72	8.64	11.44	12.25	Dec.	6.00	10.17	12.76	
June	5.02	9.47	12.20	11.89	Average for Year	6.41	8.63	12.36	
July	5.87	10.76	12.84	12.26					

World Stocks of Crude Rubber

ON HAND OR AFLOAT TO THE U. S.

At End of	ON HAND 1933	ON HAND 1934	ON HAND 1935	AFLOAT 1933	AFLOAT 1934	AFLOAT 1935	ON HAND AND AFLOAT 1933	ON HAND AND AFLOAT 1934	ON HAND AND AFLOAT 1935
Jan.	396,376	368,660	346,084	32,539	45,768	42,066	428,915	414,428	388,150
Feb.	381,794	358,681*	339,335*	32,898	53,063	42,969	414,692	411,744*	382,304*
Mar.	390,135	352,897*	338,700	29,531	54,722	44,485	419,666	407,619*	383,185
Apr.	382,167	351,073*	334,954	30,745	56,251	37,651	412,912	407,324*	372,605
May	364,623	350,935*	319,281	43,342	57,921	44,375	407,965	409,250	363,656
June	333,954	358,461*	320,470	63,608	46,698	55,581	397,562	404,847	376,051
July	326,609	365,072	330,528	57,435	45,869	49,018	384,044	410,941	379,546
Aug.	325,148	362,647		53,084	40,278		378,232	402,925	
Sept.	334,637	359,667		57,255	38,831		391,982	398,498	
Oct.	343,579	362,018		58,568	38,247		402,147	400,265	
Nov.	353,852	361,236		57,140	38,625		410,992	399,861	
Dec.	364,541	352,632		55,606	47,644		419,147	400,276	

(Rubber Manufacturers' Association figures raised to 100%)

* Revised.

STOCKS IN GREAT BRITAIN

Stocks in London

(No. of Tons in Wharves and Warehouses, including Latex)

At end of	1933	1934	1935	At end of	1933	1934	1935
Jan.	36,481	38,570	81,807	July	41,178	50,490	99,226
Feb.	37,182	38,752	87,605	Aug.	39,480	48,953	
Mar.	40,589	40,501	92,664	Sept.	39,237	56,103	
Apr.	40,911	42,413	94,361	Oct.	37,101	63,079	
May	41,998	42,190	95,722	Nov.	36,139	67,656	
June	43,032	45,674	98,077	Dec.	35,615	72,285	

At End of Recent Weeks

	First Saturday	Second Saturday	Third Saturday	Fourth Saturday	Fifth Saturday
1935					
Apr.	93,209	94,130	94,361	94,543	
May	95,138	95,454	96,097	96,962	
June	96,067	96,463	96,749	97,385	97,112
July	98,302	98,784	97,934	98,342	
Aug.	98,950	99,423	100,533	99,860	100,972

Stocks in Liverpool

1935				
Apr.	70,151	70,057	70,886	70,729	
May	71,488	71,278	71,673	72,027	
June	71,839	72,605	73,338	73,569	73,257
July	74,211	74,527	74,250	74,766	
Aug.	74,948	75,778	75,752	75,503	75,733

STOCKS IN PENANG AND SINGAPORE

(Stocks held by Dealers—Quantities in Long Tons)

End of	1932	1933	1934	1935	End of	1932	1933	1934	1935
Jan.	48,850	22,525	40,405	50,588	July	17,017	36,972	65,099	41,266
Feb.	46,954	21,530	41,884	51,628	Aug.	20,649	38,601	59,227	
Mar.	46,591	24,594	47,933	46,046	Sep.	20,415	36,948	54,905	
Apr.	39,663	25,460	48,431	43,293	Oct.	23,158	37,282	54,155	
May	38,690	29,822	76,393	45,625	Nov.	25,419	39,018	49,282	
June	19,770	34,676	73,218	43,866	Dec.	25,341	38,269	51,255	

STOCKS IN OTHER CENTRES

End of: 1934	Malaya Mainland	Holland	Colombo	Para and Manaos
Nov.	33,590	1,404	5,631	3,081
Dec.	23,173	1,326	5,732	3,293
Jan., 1935	33,609	1,397	5,926	3,477
Feb.	32,062	1,534	4,753	3,153
Mar.	31,844	1,551	3,917	3,214
Apr.	33,583	1,536	4,245	3,019
May	31,896	1,499	4,910	2,643
June	33,823	1,481	4,659	2,012
July	33,949	1,448		

RUBBER STOCKS AFLOAT

End of: 1934	Afloat for United States	Afloat for Europe	All Other * Afloat	Total * Afloat
April	56,251	32,640	24,866	113,757
May	57,921	39,370	43,854	141,145
June	46,698	36,870	26,910	110,478
July	45,869	35,430	15,355	96,654
August	40,278	36,060	21,001	97,349
September	38,831	39,630	35,215	113,716
October	38,247	40,560	20,061	98,868
November	38,625	39,870	21,342	99,837
December	47,644	41,200	36,132	124,976
End of: 1935				
January	42,066	35,600	35,334	113,000
February	42,969	28,750	31,281	103,000
March	44,485	30,400	17,115	92,000
April	37,651	31,400	28,949	98,000
May	44,375	30,300	28,325	103,000
June	55,581	28,000P	16,419	100,000
July	49,018	28,000P	17,982	95,000

* *Total Afloat* is an arbitrary estimate based on 1½ months' shipments as adopted by the Department of Commerce. *All Other Afloat* is determined by subtracting the amount of stocks in transit to the United States and Europe from the estimated total.

P—Preliminary estimate.

U. S. Tire and Tube Statistics[1]

(All Figures Represent Thousands)

AUTOMOBILE CASINGS

Figures for Recent Years

	1927	1928	1929	1930	1931	1932	1933	1934
Production	64,439	77,944	68,726	50,965	48,739	40,085	45,304	47,233
Shipments	64,059	74,296	69,395	53,638	48,151	40,260	44,094	46,687
Inventory [2]	10,264	13,624	11,838	9,003	7,775	7,644	8,888	9,455

Figures for Recent Months

	PRODUCTION 1933	PRODUCTION 1934	PRODUCTION 1935	SHIPMENTS 1933	SHIPMENTS 1934	SHIPMENTS 1935	INVENTORY 1933	INVENTORY 1934	INVENTORY 1935
Jan.	2,258	3,922	4,626	2,597	3,222	3,663	7,237	9,684	10,398
Feb.	2,339	4,335	4,383	2,292	3,285	3,287	7,377	10,725	11,530
Mar.	2,038	5,180	4,346	2,092	4,223	4,204	7,290	11,651	11,675
Apr.	3,123	4,470	4,512	3,654	4,438	5,144	6,778	11,981	11,003
May	5,189	4,456	4,175	5,180	5,332	4,067	6,760	11,127	11,131
June	6,100	4,342	3,910	6,305	5,228	4,262	6,615	10,219	10,755
July	5,714	3,353		5,497	4,157		6,844	9,437	
Aug.	4,994	3,533		4,707	4,308		7,070	8,697	
Sept.	3,999	2,936		3,503	3,183		7,595	8,419	
Oct.	3,249	3,287		2,537	3,010		8,462	8,657	
Nov.	3,039	3,341		2,197	3,191		9,247	8,779	
Dec.	3,082	3,778		3,531	3,109		8,888	9,455	

AUTOMOBILE INNER TUBES

Figures for Recent Years

	1927	1928	1929	1930	1931	1932	1933	1934
Production	70,823	80,180	68,829	52,420	48,333	36,891	42,546	46,228
Shipments	72,896	77,127	70,592	54,938	50,021	37,911	41,391	45,046
Inventory [2]	13,692	16,117	12,807	9,999	7,922	6,749	7,815	9,180

Figures for Recent Months

	PRODUCTION 1933	PRODUCTION 1934	PRODUCTION 1935	SHIPMENTS 1933	SHIPMENTS 1934	SHIPMENTS 1935	INVENTORY 1933	INVENTORY 1934	INVENTORY 1935
Jan.	2,093	3,530	4,259	2,535	3,199	3,722	6,197	8,403	9,621
Feb.	2,224	4,077	4,171	2,102	3,323	3,362	6,357	8,445	10,466
Mar.	1,883	5,194	4,123	1,902	4,118	4,168	6,369	10,244	10,406
Apr.	2,853	4,735	4,259	3,051	4,342	4,453	6,189	10,585	10,170
May	5,189	4,359	3,892	5,180	4,902	3,451	6,760	10,043	10,615
June	5,448	4,097	3,480	5,778	5,309	4,024	6,097	8,795	10,050
July	5,603	3,531		5,211	4,323		6,440	8,053	
Aug.	4,916	3,680		4,687	4,198		6,628	7,555	
Sept.	3,827	3,110		3,472	3,024		7,008	7,639	
Oct.	3,506	3,219		2,676	2,689		7,831	8,151	
Nov.	2,863	3,169		2,103	2,767		8,625	8,503	
Dec.	2,631	3,503		3,410	2,850		7,815	9,180	

(1) Rubber Manufacturers' Association figures, raised to 100%. The Association estimates its figures to be 75% complete up until 1929 and 80% complete for 1929-1933. Beginning 1934, the Association reported its figures to be 97% complete.

(2) Held by manufacturers at end of period indicated.

Automobile Production

	United States Total	United States Passenger Cars	United States Trucks	Canada Total	Canada Passenger Cars	Canada Trucks	Grand Total
1928	4,357,384	3,826,613	530,771	242,382	196,737	45,645	4,599,944
1929	5,358,420	4,587,400	771,020	263,295	207,498	55,797	5,621,715
1930	3,355,986	2,814,452	540,534	154,192	125,442	28,750	3,510,178
1931	2,389,730	1,973,090	416,640	82,621	63,477	19,144	2,472,351
1932	1,370,678	1,135,493	235,187	60,816	50,718	10,098	1,431,494
1933*	1,920,057	1,573,512	346,545	65,924	53,855	12,069	1,992,126
1934	2,778,739	2,190,099	588,640	116,890	92,538	24,352	2,895,629
1934							
July*	266,576	223,868	42,708	11,114	8,407	2,707	277,690
August*	234,810	183,500	51,310	9,904	7,325	2,579	244,714
Sept.*	168,871	123,909	44,962	5,579	4,211	1,368	174,450
Oct.*	132,491	84,503	47,988	3,780	2,125	1,655	136,271
Nov.*	78,465	45,556	32,909	1,697	1,052	645	80,162
Dec.	183,187	128,059	55,128	2,732	2,334	398	185,919
1935							
Jan.*	292,817	229,233	63,584	10,607	8,269	2,338	303,424
Feb.*	335,699	275,623	60,076	18,114	13,885	4,229	353,813
March*	429,834	361,816	68,018	21,975	18,179	3,796	451,809
April*	477,746	401,628	76,118	24,121	20,686	3,435	501,867
May*	364,727	307,522	57,205	20,765	17,093	3,672	385,492
June	361,320	296,609	64,711	15,745	12,276	3,469	377,065
July	337,049	276,084	60,965	13,069	9,471	3,598	350,118

* Revised.

Exports of Crude Rubber from Principal Producing Countries

(Long Tons)

	BRITISH MALAYA [1]							DUTCH EAST INDIES [6]							
	Gross Exports	Imports	Gross Exports Minus Imports	Ceylon [2]	India & Burma [3]	Sarawak [4]	British North Borneo [5]	Siam [4]	Java & Madura	Sumatra E. Coast	Other D.E.I.	Indo-China [5]	Amazon Valley	All Other [6]	World Total [7]
1923	252,816	70,432	181,584	39,971	6,416	5,705	4,237	1,718	32,930	46,344	57,822	5,067	16,765	7,856	406,415
1924	259,706	108,524	151,182	39,997	7,697	6,699	4,621	2,962	42,446	54,497	80,347	6,688	23,165	9,065	429,366
1925	316,825	158,022	158,803	49,566	10,082	5,424	5,377	5,377	46,757	65,499	120,626	7,881	25,298	13,797	514,487
1926	391,328	151,243	240,085	58,962	9,874	9,155	6,079	4,027	52,186	71,413	121,231	8,203	24,298	16,017	621,530
1927	371,322	182,845	188,477	55,356	11,321	10,923	6,582	5,472	55,297	77,815	142,171	8,645	28,782	15,633	606,474
1928	409,430	149,787	259,643	57,267	10,790	10,087	6,698	4,813	58,848	82,511	121,770	9,548	21,129	10,690	653,794
1929	574,836	163,092	411,744	81,584	11,663	11,077	7,381	5,018	65,990	87,789	134,037	9,696	21,148	6,767	853,894
1930	547,043	133,876	413,167	76,970	10,782	10,309	6,781	4,251	69,755	79,396	115,254	7,665	14,260	5,651	814,241
1931	519,740	125,506	394,234	61,769	8,470	10,451	6,247	4,218	75,952	87,747	116,009	11,696	12,121	3,294	792,203
1932	478,252	92,539	385,713	48,973	3,888	6,960	4,664	3,451	61,312	79,837	85,871	13,883	6,450	1,816	702,818
1933	573,412	167,377	406,035	63,351	4,527	10,874	7,555	7,765	73,851	91,861	149,659	18,394	9,883	2,737	846,312
1933:															
July	50,531	18,772	31,759	4,201	270	1,358	728	797	7,367	8,580	16,534	1,310	913	166	73,983
Aug.	52,436	17,869	34,567	5,839	246	955	728	926	6,460	7,985	15,161	808	1,116	323	75,114
Sept.	49,607	15,146	34,461	5,111	125	1,027	727	611	5,868	9,164	15,005	1,702	656	274	74,731
Oct.	61,002	17,390	43,612	5,674	271	959	750	979	6,329	8,682	15,170	1,426	965	314	85,131
Nov.	54,599	20,142	34,457	6,097	516	1,020	750	1,303	6,684	9,951	14,474	1,553	956	366	78,127
Dec.	57,579	18,110	39,469	7,435	964	989	750	1,046	7,030	10,183	17,274	3,779	930	302	90,151
1934:															
Jan.	55,055	16,128	38,927	6,929	1,531	1,197	805	1,290	6,513	7,975	13,913	1,109	576	127	80,892
Feb.	57,867	15,027	42,840	8,620	775	1,005	805	1,264	6,706	9,211	13,696	1,232	831	105	87,090
March	58,515	19,907	38,608	6,750	1,412	1,360	806	1,363	8,655	10,539	19,084	1,968	846	113	91,504
April	56,748	20,957	35,791	5,157	762	1,447	894	1,311	7,282	9,808	19,250	1,330	440	236	83,708
May	69,403	25,691	43,712	8,870	1,106	1,892	1,397	997	12,104	14,606	26,598	1,243	726	328	113,579
June	53,282	20,981	32,301	5,397	1,425	1,886	644	1,497	4,860	6,192	15,956	1,593	765	377	72,893
July	53,335	22,829	30,506	3,818	710	1,662	1,048	2,399	5,762	7,369	14,415	1,703	353	252	69,997
Aug.	52,641	17,865	34,776	4,948	552	1,714	1,048	1,908	5,340	8,901	11,356	1,610	710	251	73,114
Sept.	61,051	17,889	43,162	6,555	294	1,438	839	1,626	5,722	10,738	14,688	1,665	764	222	87,713
Oct.	47,045	10,226	36,819	6,544	413	1,412	1,196	1,328	5,970	6,643	5,556	1,413	840	401	68,535
Nov.	51,140	8,759	42,381	6,756	501	953	941	1,356	7,621	7,123	5,338	2,356	1,017	334	76,676
Dec.	59,575	15,375	44,200	8,481	990	1,237	680	2,043	10,865	12,953	12,354	2,956	1,035	239	98,033
1935															
Jan.	56,720	17,142	39,578	5,202	2,269	1,630	1,222	2,614	3,812	5,371	8,704	2,650	1,196	460	74,719
Feb.	50,593	17,676	32,917	5,556	731	1,887	760	2,288	4,395	7,663	15,194	2,076	636	254	74,154
Mar.	47,407	13,437	33,970	3,181	701	1,901	773	2,076	5,592	7,950	7,973	1,472	740	526	66,855
Apr.	53,360	16,029	37,331	2,976	370	1,895	846	1,661	5,574	6,873	12,683	2,827	963	185	74,957
May	51,353	23,720	27,633	4,223	674	2,323	848	2,752	6,217	7,931	21,058	2,138	832	315	76,920
June	49,751	18,637	31,114	3,525	1,077	2,031	603	2,869	5,698	8,258	14,168	2,021	659	300*	72,323
July	48,975	11,257	37,718	4,106	580	1,870	1,164	1,939	5,899	5,664	8,373	2,015	500*	300*	70,128
Aug.	51,873	10,978	40,895	5,683											

(1) Malayan net exports cannot be taken as production, since imported rubber is largely wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 115 tons in 1923, 1,117 in 1924, 3,618 in 1925, 3,263 in 1926, 2,439 in 1927, 1,437 in 1928, 2,670 in 1929, and 1,274 in 1930. (2) Ceylon Chamber of Commerce statistics until 1926; rubber exported as latex is not included—such shipments were equivalent to 18 tons in 1923, 93 tons in 1924, 6 tons in 1925, 20 tons in 1926, about ½ ton in 1927, and 1 ton in 1928, and practically none in 1929, 1930 and 1931. (3) Official statistics. (4) Imports into Singapore and Penang. (5) Exports from "Other D.E.I." are chiefly wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 2,342 tons in 1923, 1,008 tons in 1924, 2,239 tons in 1925, 44 tons in 1926, 84 tons in 1927, 1,459 tons in 1928, 1,302 tons in 1929, and 2,656 tons in 1930. (6) Calculated from official import statistics of principal consuming countries, viz., United States, United Kingdom, France, Germany, Belgium and Netherlands, and includes guayule rubber. (7) This total includes the third column for British Malaya, "Gross Exports minus Imports," and all the figures shown for the other territories. * Figure is provisional: final figure will be shown when available.

NOTE: THE FIGURES FOR 1933 ARE REVISED AS OF JANUARY 25, 1935 AND REPRESENT FINAL FIGURES

Net Imports of Crude Rubber into Principal Manufacturing Countries

(*Long Tons*)

	United States [1]	United Kingdom	France (h)	Germany	Canada (ac)	Japan (da)	Italy	Russia (ce)	Australia (cd)	Belgium (d)	Netherlands	Scandinavia (abcdf)	Spain (g)	Czechoslovakia (abcd)	World Total
1919	238,407	42,671	17,685	5,584	6,395	9,753	9,894	75	1,002	3,995	2,771	3,149	2,418	9	343,808
1920	249,530	56,844	13,885	11,890	11,746	5,297	6,123	62	1,815	3,840	5,510	2,292	2,008	567	371,409
1921	179,736	42,087	15,135	21,920	8,124	21,713	3,906	165	1,014	1,705	1,022	1,279	2,245	569	300,620
1922	296,594	11,724	24,352	27,546	9,207	15,934	6,430	2,493	2,643	172	—3,807	1,778	589	567	396,222
1923	301,527	12,700	27,392	18,519	13,277	15,372	8,489	2,986	1,649	2,184	792	2,528	630	1,128	409,173
1924	319,103	—11,550	30,446	22,727	14,299	19,571	8,764	2,346	3,124	2,688	—807	3,178	944	1,370	416,203
1925	385,596	4,061	32,956	33,937	19,683	11,117	11,412	7,088	4,757	2,930	875	3,149	1,155	1,558	520,274
1926	399,981	84,865	34,240	22,775	20,229	18,125	9,809	6,529	9,021	2,498	2,670	4,046	1,299	1,870	617,957
1927	403,472	60,249	34,271	38,892	26,405	20,521	11,381	12,018	9,490	6,482	636	4,224	2,055	2,672	632,768
1928	407,572	4,846	36,496	37,855	30,447	25,621	12,433	15,134	8,430	7,958	2,243	4,418	3,178	3,138	599,771
1929	528,608	122,675	55,093	49,275	35,453	34,284	17,169	11,774	15,886	9,445	3,022	6,440	864	4,650	894,638
1930	458,036	120,069	68,503	45,488	28,793	33,039	18,639	16,387	5,354	10,635	2,924	7,710	2,400	4,468	822,445
1931	475,993	86,170	46,466	39,688	25,261	43,483	10,149	30,671	7,649	11,009	2,220	6,360	2,605	7,717	794,641
1932	393,844	44,086	42,506	45,121	20,917	56,027	14,469	30,637	12,576	9,519	2,851	7,262	4,359	9,444	693,618
1933	398,365	73,335	61,953	54,120	19,332	66,831	19,341	29,830	13,534	11,166	1,243	7,831	5,520	10,402	.....
1933:															
Nov.	39,633	3,955	5,419	4,086	2,184	6,296	942	4,483	301	1,129	222	878	493	882	70,903
Dec.	38,864	6,524	5,415	4,933	1,773	6,865	1,029	2,400	190	1,360	213	703	776	1,772	72,817
1934:															
Jan.	47,114	9,503	6,472	6,057	1,721	5,628	2,517	2,749	566	2,173	381	1,185	484	1,355	88,276
Feb.	33,087	10,785	5,301	5,490	1,854	4,570	2,388	3,399	950	1,538	287	464	656	516	73,357
Mar.	39,306	14,008	4,980	6,453	3,411	5,655	1,394	4,018	671	965	284	836	394	976	86,242
Apr.	42,262	9,999	3,210	6,701	2,419	5,679	1,966	1,326	415	504	262	1,217	752	465	77,177
May	47,412	9,786	3,634	6,499	2,218	6,905	2,218	4,360	769	214	322	940	142	1,768	87,192
June	46,785	16,564	3,803	6,171	2,208	6,745	1,887	3,145	1,512	837	331	843	1,146	1,624	93,601
July	40,308	12,266	4,051	5,494	2,430	5,739	708	1,640	732	810	540	1,602	747	1,094	78,161
Aug.	31,405	13,728	3,660	3,078	1,948	4,945	1,795	6,829	658	669	239	1,033	277	1,495	71,759
Sept.	30,345	11,254	4,244	2,607	2,770	7,346	1,486	4,487	743	501	339	980	465	477	68,044
Oct.	27,323	18,897	3,424	2,148	3,043	7,227	1,296	3,681	798	693	447	813	675	254	70,719
Nov.	35,982	15,875	3,176	3,425	1,568	5,580	1,764	4,488	516	379	187	1,382	542	215	75,079
Dec.	17,305	15,816	3,605	5,207	2,849	3,904	1,979	6,460	1,312	—168	139	1,143	615	762	60,928
1935															
Jan.	39,546	20,383	5,573	4,286	2,670	4,400	1,613	3,446	1,099	419	158	1,252	468	1,245	86,558
Feb.	45,999	15,609	4,593	3,513	1,558	5,582	4,356	1,810	848	399	477	838	567	1,836	87,985
Mar.	44,772	12,810	4,017	6,353	2,710	4,421	1,582	4,624	1,459	240	331	891	630	741	85,581
Apr.	40,061	11,574	3,306	5,820	1,063	6,635	1,653	3,387	1,150	520	329	1,049	432	789	78,115
May	29,962	12,498	3,828	6,049	3,929	5,429	935	1,937	671	982	272	853	815	774	68,934
June	31,410	10,253	3,210	4,551	1,435	3,373	1,000*	3,087	496	1,065	446	780	745	604	62,455
July	47,694	9,454	3,247	4,929											

a—Including gutta percha. b—Including balata. c—Re-exports not deducted in monthly statistics. d—Including some scrap and reclaimed rubber. e—Official statistics of rubber imports by Soviet Russia. f—Including Norway, Sweden, Denmark and Finland. g—United Kingdom and French exports to Spain except in years prior to 1925. h—French imports have been reduced 12 per cent in order to eliminate imports of gutta percha and to reduce to basis of net weight. [1] United States imports of guayule are included in this compilation. * Figure is provisional; final figure will be shown immediately it becomes available.

A Section Devoted to Listings of Leading Producers and Distributors of Raw Materials, Machinery and Equipment, and Supplies for the Rubber Industry.

The Market Place

Chemicals and Compounding Materials — Machinery and Equipment—Crude, Reclaimed and Scrap Rubber—Fabrics—Rubber Products — Consulting Engineers.

Chemicals and Compounding Materials —

ACCELERATORS—
Ureka C—Ureka Blend B—Ureka.—A-1, A-7, A-11, A-16, A-19, A-32, Z-88, A-510, DPG
ANTIOXIDANTS — Flectol A, Oxynone
The RUBBER SERVICE Laboratories Co.
1012 Second National Bldg., Akron, Ohio
A Division of MONSANTO Chemical Wks.

ALUMINUM FLAKE
A uniform, fine, low gravity, white reinforcing pigment. *Furnished to the rubber trade for 25 years.*
The Aluminum Flake Co.
Akron, Ohio

ANTIMONY Pentasulphide, golden and crimson, very fine, pure.
Rare Metal Products Co.
Belleville, N. J.
Direct Factory Representation

ASBESTINE—Specially prepared for use in Rubber. Send for liberal working samples.
SOLE PRODUCERS
International Pulp Co.
41 Park Row New York City

CADMIUM REDS
In 6 Shades . . Deep Orange to Extra Dark Red
LITHOPONES
Standard and Titanated
United Color and Pigment Co., Inc.
Newark, New Jersey
Branches in Principal Cities

CALCENE—The Ideal low gravity, white reinforcing pigment. Gives high tensile and elongation properties with exceptionally good resistance to tear and abrasion.
The Columbia Alkali Corporation
BARBERTON, OHIO

CARBON BLACK—*Micronex*
the world's standard gas black, universally known as the "King of Rubber Pigments."
Binney & Smith Co.
41 East 42nd St. New York City

IN this section are listed the products of the leading producers of materials and equipment used by rubber manufacturers.

When buyers refer to these pages for their needs, your name and address and a description of your products should be available here. The cost of a one-inch listing is only $5.00 per issue—the lowest cost of advertising space available in the rubber field.

THE RUBBER AGE
250 West 57th St., New York

CABOT CERTIFIED CARBON BLACK
"Spheron"
Godfrey L. Cabot, Inc.
77 Franklin St. Boston, Mass.

CARBON BLACK—*Aerfloted*
Arrow Black for rubber compounding. Standard for grit-free uniformity.
J. M. Huber, Inc.
460 West 34th St. New York

CARBON BLACK
SUPREME—*the up-to-date standard for rubber*
Imperial Oil & Gas Products Co.
Union Bank Bldg., Pittsburgh, Pa.

CARBON BLACK
DIXIE...KOSMOS
Used throughout the world
UNITED CARBON COMPANY
Charleston, W. Va.
New York • Akron • Chicago

CARBON BLACK
DISPERSO . . . *the specially developed Carbon Black that gives* BETTER DISPERSION.
WISHNICK-TUMPEER, INC.
295 Madison Ave., New York

CATALPO—The universal and standard rubber pigment now being used in treads, solids, tubes, carcass frictions, etc.
Moore & Munger
33 Rector Street, New York City

CHEMICALS

For Rubber	For Industry Generally	
Accelerators	*Acids*	*Latex*
Antioxidants	*Oil of Myrbane*	*Lotol*
Specialties	*Aniline Oil*	*Dispersions*

NAUGATUCK CHEMICAL
Div. of U. S. Rubber Products, Inc.
1790 BROADWAY NEW YORK

CHEMICALS and compounding ingredients; Clay, Accelerators, Mineral Rubber.
R. T. Vanderbilt Co.
230 Park Ave. New York City

CHEMICALS and Mineral Ingredients—Whiting, Clay, Talc, Barytes, Colors. Heavy Calcined Magnesia. Carbonate of Magnesia, Pumice Stone.
Standard Since 1890
Whittaker, Clark & Daniels, Inc.
260 West Broadway New York

COLLOIDAL SULPHUR
COLLOIDAL ZINC OXIDE
COLLOIDAL COLORS
Heveatex Corporation
78 Goodyear Ave., Melrose, Mass.
Offices in New York, Akron, Chicago

COLORS—*for Rubber*
Fine organic colors—Reds, Blues, Oranges, Violets, Greens—or any shade to meet your requirements—also Rubber Dispersed Colors
Ansbacher-Siegle Corporation
Rosebank, Staten Island, N. Y.
820 So. Clinton St., Chicago, Ill.
Agents in Principal Cities

COLORS
BRILLIANT ORGANIC DYES; PERMANENT, NON-BLEEDING, LOW COST
For All Cures
The RUBBER SERVICE LABORATORIES CO.
1012 Second National Building
Akron, Ohio

THE MARKET PLACE Section Continued on Next Page